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TO STUDY THE IMPACT OF SCREEN TIME ON BEHAVIOUR AND ACADEMIC PERFORMANCE IN ADOLESCENT AGE GROUP

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LIST OF ABBREVIATIONS

1. ADHD – Attention-Deficit/Hyperactivity Disorder
2. APA – American Psychological Association
3. BMI – Body Mass Index
4. CDC – Centers for Disease Control and Prevention
5. COVID-19 – Coronavirus Disease 2019
6. DSM-5 – Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
7. HRQoL – Health-Related Quality of Life
8. ICT – Information and Communication Technology
9. ICTs – Information and Communication Technologies
10. OECD – Organisation for Economic Co-operation and Development
11. SES – Socioeconomic Status
12. SNS – Social Networking Sites
13. TV – Television
14. USA – United States of America
15. WHO – World Health Organization

INTRODUCTION

INTRODUCTION

Adolescence represents a critical developmental period marked by increased vulnerability to mental health problems. According to the 2021 update by the World Health Organization (WHO), it is estimated that 14% of young people aged 10 to 18 years suffer from mental health problems, accounting for 13% of all diseases affecting this population globally.[1] Depression, anxiety, and behavioural disorders rank among the leading causes of illness and disability in adolescents, with suicide being the fourth leading cause of death among those aged 15 to 18 years. This underscores the urgent need to understand factors contributing to these outcomes, one of which is the pervasive use of screen media.

The rising use of screen-based devices, encompassing smartphones, tablets, computers, and televisions, has introduced complex dynamics into adolescent development. A growing body of evidence suggests that screen media use could play a significant role in influencing cognition—the brain processes involved in knowledge acquisition, intellect, and action—as well as academic performance, defined by academic achievement and abilities. Recent empirical research indicates that excessive screen media use may reduce functional connectivity between cognitive brain areas, potentially hindering critical developmental processes. However, the literature presents mixed findings, with studies reporting negative, positive, and null associations between screen time and academic performance.[2] The lack of consensus in this area highlights the need for more comprehensive and detailed research.

Screen media use may also impact adolescent behaviour, including emotional regulation, social interactions, and mental well-being. For instance, a UK-based study found that low to moderate levels of screen time were associated with optimal mental health outcomes, suggesting that conservative amounts of video game use and social media engagement can stimulate creativity, relaxation, and social connectedness. Conversely, Canadian research has shown that excessive screen time correlates with lower optimism and worsened symptoms of anxiety and depression among adolescents.[3-5] These divergent findings emphasize the importance of

contextualizing screen time within individual and cultural factors to understand its effects comprehensively.

The average daily screen time among adolescents has dramatically increased in recent years. A 2010 National Kaiser Family Foundation survey in the United States revealed that children aged 8 to 18 years had an average screen time of 7.5 hours per day. This far exceeds the American Academy of Pediatrics (AAP) recommendation of limiting screen time to two hours or less per day. Unfortunately, comparable data for India is unavailable, making it challenging to gauge the scale of the problem within the Indian context.[6-7] The absence of such data highlights a significant gap in understanding how cultural, socioeconomic, and technological factors intersect to shape adolescent screen use in India.

Screen time refers to the time spent engaging with electronic screens such as mobile phones, tablets, laptops, and monitors for activities that require sustained attention, fixed eye movement, and proper posture to maintain focus for a desired period. In the context of adolescents, screen time spans various domains, including academic activities, recreational video gaming, and social media usage. Each of these activities introduces unique cognitive and BEHAVIOURAL challenges, further complicating the assessment of screen time's overall impact.[8]

Adolescents are particularly susceptible to the effects of screen time due to the rapid development of their brains during this period. Neurological studies suggest that excessive screen use may disrupt the maturation of the prefrontal cortex, which is responsible for decision-making, impulse control, and emotional regulation. Simultaneously, the dopamine-driven reward system activated by screen-based activities, such as gaming and social media, can lead to addictive behaviours that interfere with healthy routines and priorities.[9-10]

Academic performance is one of the key areas where screen time exerts a profound influence. Several studies have suggested that prolonged exposure to screens, especially for non-educational purposes, may be associated with lower grades, reduced attention spans, and diminished problem-solving skills. For example, students spending more time on social media or gaming platforms often report difficulty concentrating on academic tasks. On the other hand, certain educational applications

and online resources have been shown to enhance learning outcomes, suggesting that the quality and purpose of screen time play a pivotal role in determining its impact.[11]

BEHAVIOURAL changes linked to screen time are equally concerning. Adolescents with high screen exposure are more likely to exhibit signs of aggression, irritability, and social withdrawal. Excessive gaming, for instance, has been associated with increased impulsivity and reduced empathy, while prolonged social media use may contribute to feelings of inadequacy, cyberbullying, and disrupted sleep patterns. These behavioural shifts not only affect interpersonal relationships but also have long-term implications for mental health and social integration.[13]

The relationship between screen time and mental health is multifaceted. While moderate screen use can foster creativity and social connectedness, excessive exposure often correlates with higher rates of depression, anxiety, and stress. For example, studies have shown that adolescents spending more than three hours daily on screens are at a higher risk of experiencing depressive symptoms. Furthermore, the "fear of missing out" (FOMO) associated with social media can exacerbate feelings of loneliness and inadequacy, particularly among adolescents navigating identity formation and peer relationships.[12]

In addition to its psychological effects, screen time also influences physical health, indirectly affecting academic performance and behaviour. Prolonged screen exposure is associated with sedentary lifestyles, which contribute to obesity, poor posture, and musculoskeletal problems. These physical health issues, in turn, can impair concentration, energy levels, and overall well-being, further complicating the academic and social lives of adolescents.[14]

The lack of consistent guidelines and parental supervision regarding screen use further exacerbates the problem. While organizations like the AAP provide recommendations for screen time limits, their applicability varies across cultural and socioeconomic contexts. In many Indian households, for instance, screen time is often unsupervised due to parental workloads or limited awareness of its potential impacts. This highlights the need for culturally sensitive interventions and public health campaigns to educate parents and caregivers about the importance of balanced screen use.

The current study aims to bridge the existing knowledge gaps by exploring the impact of screen time on both behaviour and academic performance in adolescents. By examining these two domains together, the research seeks to provide a holistic understanding of how screen exposure shapes adolescent development. The findings will contribute to the development of targeted interventions and policies aimed at promoting healthier screen habits among adolescents.

NEED FOR THE STUDY

- Association between screen time with adolescent behaviour and academic performance have been examined separately ,research's that examine these two outcomes are limited in Indian population.
- There is scarce literature from Uttar Pradesh specially Ghaziabad.
- With increasing use of electronic gadgets and social media, there is subsequent increase in average screen time every year, which is creating a negative effect on subject's attention, concentration & level of patience. Therefore there is need to determine average screen time with progressing generation.

AIMS AND OBJECTIVES

AIMS & OBJECTIVES

Aim:

To study the impact of screen time on behaviour and academic performance in adolescent age group.

Objectives:

- To find out association between screen time and academic performance.
- To find out association between screen time and behaviour.
- To identify average screen time in adolescents

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Screen Time and Adolescent Development

In the contemporary digital age, the ubiquity of screens in the daily lives of adolescents has become a topic of significant interest and concern among parents, educators, and healthcare professionals. The term "screen time" encompasses the use of various digital devices such as smartphones, tablets, computers, televisions, and video game consoles. While these technologies offer a plethora of potential benefits, including access to educational resources, information, and social connectivity, the excessive use of screens has been associated with a range of adverse outcomes in adolescents [8].

To comprehend the ramifications of screen time on adolescent development, it is essential to consider the broader context of this unique developmental stage. Adolescence represents a critical period of growth and maturation, characterized by rapid and profound changes in physical, cognitive, and psychosocial domains. During this phase, the brain undergoes substantial structural and functional alterations, particularly in regions associated with executive functions, such as planning, decision-making, and impulse control . Simultaneously, the brain's reward system becomes increasingly sensitive, rendering adolescents more susceptible to the potentially addictive nature of digital media, as the constant stimulation and instant gratification provided by screens can be highly reinforcing [10].

Moreover, adolescence is a crucial period for the formation of identity and the development of social skills and relationships. As adolescents navigate the challenges of establishing a sense of self and finding their place in the world, they often rely on their peers for guidance and validation. In the digital era, a significant proportion of social interactions occur through screens, via social media platforms, messaging applications, and online gaming communities [7]. While these digital spaces can provide valuable opportunities for connection and self-expression, they can also introduce novel challenges, such as cyberbullying, social comparison, and the pressure to maintain a curated online persona [10].

Furthermore, adolescence is a time of significant cognitive development, as individuals acquire the knowledge and skills necessary for higher education and future careers . In the educational setting, technology can serve as a valuable tool for learning, offering access to a vast array of information and resources. However, excessive screen time may also interfere with academic performance by creating distractions from studying and homework, and potentially displacing other important learning activities, such as reading and face-to-face interactions .

The multifaceted nature of adolescent development highlights the complexity of the relationship between screen time and adolescent well-being. To fully understand the potential impact of screen time, it is necessary to consider not only the quantity of use but also the quality and context of that use, as well as the individual characteristics and circumstances of each adolescent [15].

Defining and Measuring Screen Time

To thoroughly examine the impact of screen time on adolescent behaviour and academic performance, it is crucial to establish a clear definition of "screen time" and understand the methods employed to measure it in research studies.

At its core, screen time refers to the duration an individual spends engaging with digital devices that feature screens, such as smartphones, tablets, computers, televisions, and video game consoles. This encompasses a wide spectrum of activities, ranging from passive media consumption (e.g., watching videos or scrolling through social media feeds) to more interactive and creative pursuits (e.g., playing video games, coding, or creating digital art) [16].

However, it is essential to recognize that not all screen time is equivalent in terms of its potential effects. The nature and quality of the content consumed, as well as the social and emotional context in which the screen time occurs, can significantly influence the outcomes associated with screen time. For instance, an hour spent using an educational application to acquire a new language or skill may have vastly different implications for cognitive development compared to an hour spent passively browsing social media [17].

To capture these nuances, researchers often differentiate between various types of screen time activities. One common categorization distinguishes between "active" and "passive" screen time . Active screen time involves activities that demand cognitive engagement and interaction, such as playing a strategic video game or creating a digital video. In contrast, passive screen time refers to activities that primarily involve the passive consumption of media, such as watching television or scrolling through social media feeds [18].

Another important distinction lies between screen time for entertainment purposes and screen time for educational or productive purposes. For example, a student utilizing a computer to conduct research for a school project or complete an online assignment would be classified as educational screen time, whereas watching YouTube videos for leisure would be considered entertainment screen time. Some researchers posit that educational screen time may have distinct effects on academic performance and cognitive development compared to purely recreational screen time [19].

In addition to categorizing the type of screen time activity, it is crucial to consider the social and emotional context in which screen time takes place. For instance, playing a video game with friends or family members may have different social implications compared to playing alone. Similarly, using social media to connect with real-life friends and family may have different emotional effects compared to interacting with strangers or engaging in social comparison [20].

The most common method employed by researchers to measure screen time is through self-report surveys or diaries, in which participants are asked to estimate the amount of time they spend on various screen-based activities over a specified period (e.g., a day or a week). For example, a study might require adolescents to report the number of hours they spent watching television, playing video games, using social media, and completing homework on a computer over the past week [21].

While self-report measures are widely used and practical, they have certain limitations. Firstly, they rely on participants' ability to accurately recall and estimate their screen time use, which may be subject to bias or error . Secondly, self-report measures often provide a relatively crude estimate of total screen time and may not capture important nuances in the type or context of use [21].

To address these limitations, some researchers have begun utilizing more objective measures of screen time, such as tracking applications or wearable devices that automatically record the duration of time spent on different devices and applications. These methods can provide a more precise and detailed picture of an individual's screen time habits, including the specific applications and websites accessed, the time of day and duration of use, and even the physical location and context of use [22].

However, tracking methods also present their own challenges and limitations. They raise important privacy concerns, as they involve the collection of sensitive personal data . Additionally, they may not always capture the full picture of an individual's screen time use, particularly if the individual uses multiple devices or engages in offline activities related to digital media (e.g., reading about a video game in a magazine) [22].

Some researchers have adopted an approach that combines self-report measures with more objective tracking data to obtain a more comprehensive and accurate representation of screen time use. For example, a study might ask participants to complete a survey about their typical screen time habits while simultaneously collecting data from a tracking application over a period of time. This approach allows researchers to compare self-reported estimates to actual usage data and identify any discrepancies or patterns [23].

Ultimately, there is no single perfect method for measuring screen time, and different approaches may be more or less appropriate depending on the specific research question and study design. However, it is evident that screen time is a complex and multifaceted construct that cannot be fully captured by a single metric or number. To truly understand the impact of screen time on adolescents, it is necessary to consider not only the quantity of use but also the quality, context, and individual characteristics of that use [22].

Prevalence of Screen Time in Adolescence

Having established a clearer understanding of the definition and measurement of screen time, it is pertinent to examine the prevalence of screen time among adolescents. The available evidence indicates that adolescents are spending a

substantial amount of time engaged with screens.

According to a comprehensive report by Common Sense Media, American teenagers (ages 13-18) spend an average of 7 hours and 22 minutes per day on entertainment screen media, excluding time spent using screens for school or homework. This represents a significant increase from previous years, largely driven by the widespread availability of smartphones and the rising popularity of social media and streaming video services [24].

To contextualize this figure, it is important to consider the limited number of hours in a day. Assuming that adolescents spend approximately 8-10 hours per day sleeping (the recommended amount for this age group), only 6-8 hours remain for all other activities, including eating, attending school, participating in extracurricular activities, socializing with friends and family, and engaging in hobbies or physical exercise . Consequently, entertainment screen time occupies a significant proportion of adolescents' waking hours, potentially displacing time that could be allocated to other important activities and experiences [25].

It is important to note that these figures represent averages, and there is considerable variation in screen time use among individual adolescents. While some may spend significantly less time on screens, others may spend substantially more. The Common Sense Media report revealed that 20% of teenagers are classified as "heavy users," spending more than 16 hours per day on entertainment screen media (including multitasking) [24].

Moreover, these estimates specifically pertain to entertainment screen time and do not account for the time adolescents spend using screens for educational or productive purposes. When considering the amount of time many adolescents are required to spend on computers and tablets for school and homework, the total daily screen time increases even further [26].

A significant portion of adolescents' screen time is devoted to social media and digital communication. A Pew Research Center survey found that 45% of teenagers (ages 13-17) report being online "almost constantly," with an additional 44% indicating that they go online several times a day [28]. The majority of this time is spent on social

media platforms such as Instagram, Snapchat, and TikTok, with 72% of teenagers reporting daily social media use [41].

In addition to social media, video streaming services like YouTube and Netflix have emerged as major sources of entertainment for adolescents. The Common Sense Media report revealed that 69% of teenagers watch online videos every day, with an average daily viewing time of 1 hour and 37 minutes [24]. This represents a notable shift from traditional television viewing, which has been declining in recent years as more content has migrated online .

Gaming is another popular screen time activity among adolescents, particularly boys. The Pew Research Center survey found that 84% of teenage boys play video games, compared to 59% of girls [28]. Among boys who play games, the average daily playing time is 1 hour and 40 minutes. Gaming has also become an increasingly social activity, with many adolescents playing online with friends or even strangers from around the world [28].

These trends are not limited to the United States. A study of adolescents in 11 European countries found that the average time spent on screens was 3.1 hours per day, with higher levels of use associated with higher rates of overweight/obesity and lower levels of physical activity. [29] Similarly, a study of Chinese adolescents found that the average screen time was 3.5 hours per day, with 16% of participants meeting criteria for problematic internet use [30].

While these statistics highlight the pervasiveness of screen time in the lives of adolescents globally, it is crucial to recognize that not all screen time is inherently detrimental. When used in moderation and with appropriate content, digital media can provide valuable opportunities for learning, creativity, and social connection . The key is to achieve a healthy balance and to be mindful of the potential risks and drawbacks associated with excessive or inappropriate use [28].

It is also important to consider the individual factors that may influence an adolescent's screen time habits. Research has demonstrated that adolescents from lower socioeconomic backgrounds tend to have higher levels of screen time compared to their more affluent peers, likely due to factors such as limited access to alternative

activities and resources . Additionally, adolescents with certain mental health conditions, such as depression and attention-deficit/hyperactivity disorder (ADHD), may be more prone to excessive or problematic screen use as a means of coping with or escaping from their symptoms [31].

Given the high prevalence of screen time among adolescents and its potential to impact development in both positive and negative ways, it is evident that this issue warrants attention from parents, educators, and health professionals . By understanding the patterns and predictors of adolescent screen use, we can begin to develop more targeted and effective strategies for promoting healthy habits and mitigating potential risks. Simultaneously, it is important to avoid demonizing all screen time use and to recognize the ways in which digital media can be harnessed for positive purposes . As with most aspects of life, moderation and mindfulness are essential [32].

Potential Risks of Excessive Screen Time

While digital media can offer numerous benefits for adolescents, there is growing concern regarding the potential negative consequences of excessive or inappropriate screen time use. This section will explore some of the key areas of risk that have been identified in the research literature, focusing on physical health, mental health, and cognitive development.

Impact on Physical Health

One of the most immediate and tangible concerns about excessive screen time is its potential impact on physical health. Prolonged periods of sedentary behaviour, often associated with screen time, have been linked to a range of adverse health outcomes, including obesity, cardiovascular disease, and metabolic disorders [33].

The relationship between screen time and obesity is particularly well-established in the research literature. A systematic review and meta-analysis conducted in 2017 found that higher levels of screen time were associated with a 67% increased risk of obesity among children and adolescents [34]. This relationship was consistent across different types of screen time (e.g., television viewing, computer use, video gaming)

and was independent of physical activity levels [35].

Several potential mechanisms may explain how screen time contributes to weight gain and obesity. First, excessive screen time may displace time that would otherwise be allocated to physical activity, leading to a more sedentary lifestyle [36]. Second, screen time is often associated with unhealthy snacking behaviours, as individuals may mindlessly consume high-calorie foods and beverages while distracted by a screen [37].

Screen time has also been linked to disruptions in sleep, which can have cascading effects on physical health. The blue light emitted by electronic devices can interfere with the body's natural production of the sleep hormone melatonin, making it more difficult to fall asleep and maintain sleep [38]. Poor sleep quality and quantity, in turn, have been associated with a range of negative health outcomes, including obesity, insulin resistance, and impaired immune function [39].

Impact on Mental Health

In addition to physical health concerns, there is growing evidence to suggest that excessive screen time may have negative impacts on adolescent mental health and well-being. While the relationship between screen time and mental health is complex and likely bidirectional (meaning that mental health problems may lead to excessive screen use, and vice versa), several studies have found associations between high levels of screen time and symptoms of depression, anxiety, and other mental health issues [39].

One of the most well-studied areas of concern is the link between social media use and mental health. A systematic review and meta-analysis conducted in 2019 found that higher levels of social media use were associated with increased risk of depression, anxiety, and psychological distress among adolescents [40]. The authors suggest that this relationship may be due in part to the social comparison and feedback-seeking behaviours that are common on social media platforms, which can lead to feelings of inadequacy and low self-esteem [41].

Another potential mechanism by which screen time may impact mental health is

through its effects on sleep. As mentioned earlier, the blue light emitted by electronic devices can interfere with the body's natural sleep-wake cycle, making it harder to fall asleep and stay asleep [42]. Poor sleep quality and quantity, in turn, have been consistently linked to a range of mental health problems, including depression, anxiety, and even suicidal ideation [43].

Screen time may also impact mental health by displacing other important activities and experiences that are protective against mental health problems. For example, excessive screen time may leave less time for in-person social interactions, physical activity, and other hobbies and interests that can provide a sense of meaning and fulfillment . Additionally, some researchers have suggested that the constant stimulation and instant gratification provided by digital media may interfere with the development of important emotional regulation and coping skills [44].

Impact on Cognitive Development

Concerns have also been raised about the potential impact of excessive screen time on cognitive development in adolescents. Some researchers have proposed that the constant stimulation and instant gratification provided by digital media may interfere with the development of important cognitive skills, such as sustained attention, critical thinking, and problem-solving [44].

A study conducted in 2015 found that adolescents who spent more time on screens (particularly watching television and playing video games) had lower scores on cognitive tests measuring processing speed, working memory, and fluid reasoning .[45] However, it is important to note that this study was cross-sectional in nature and cannot establish causality. It is possible that adolescents with pre-existing cognitive challenges may be more drawn to screens as a form of entertainment or escape [46].

Other research has suggested that the type and quality of content consumed may be more important than the total amount of screen time. A study conducted in 2017 found that adolescents who used social media and video games more frequently had lower grades and test scores, while those who used the internet for research and communication had higher academic achievement [46]. This highlights the importance of considering the context and purpose of screen time use, rather than just the quantity.

Potential Benefits of Screen Time

While much of the research on screen time has focused on potential risks, it is essential to recognize that digital media can also offer benefits for adolescent development. When used in moderation and for appropriate purposes, screen time can provide opportunities for learning, social connection and personal growth.

Educational Opportunities

One of the most promising potential benefits of screen time is the access it provides to a vast array of educational resources and opportunities. The internet serves as an immense repository of information, offering tools and content that can support learning across various subjects and skills. Online courses, educational videos, and interactive simulations can supplement traditional classroom instruction, providing students with additional avenues to engage with material and deepen their understanding [22].

Consider, for example, a student who is struggling to grasp a complex concept in their physics class. In the past, their options for additional help might have been limited to their textbook, their teacher, or perhaps a tutor. However, with the wealth of educational content available online, this student now has access to a multitude of resources that can help them approach the concept from different angles. They might watch a series of YouTube videos that break down the concept step-by-step, complete with visual aids and real-world examples. They could participate in an online forum where they can ask questions and receive guidance from experts in the field. They might even access an interactive simulation that allows them to manipulate variables and observe the effects, providing a hands-on way to explore the underlying principles.

The potential benefits of this kind of educational screen time are significant. By providing multiple ways to engage with and practice applying new knowledge, digital resources can help students develop a deeper, more flexible understanding of the material [28]. This is particularly valuable for students who may struggle with traditional instructional methods or who need additional support outside of the classroom.

Moreover, the self-directed nature of many online learning resources can foster important skills like initiative, self-regulation, and metacognition [28]. When students are able to seek out and engage with content based on their own learning needs and interests, they develop the ability to take ownership of their learning and to monitor their own understanding. These are critical skills that will serve them well not just in their academic pursuits, but throughout their lives.

A 2019 study underscores the potential academic benefits of educational screen time. The researchers found that adolescents who used the internet for educational purposes (such as researching for school projects or communicating with teachers) had higher academic achievement and self-efficacy than those who used the internet primarily for entertainment [47]. This suggests that the quality and purpose of screen time, rather than just the quantity, may be important factors in determining its educational impact.

However, it's crucial to recognize that not all students have equal access to technology and online educational resources. The "digital divide" - the gap between those who have ready access to computers and the internet and those who do not - can exacerbate existing educational inequalities [48]. Students from lower-income households, for example, may have limited access to devices or reliable internet connectivity at home, hindering their ability to take advantage of online learning opportunities. This is a complex societal issue that will require concerted efforts from policymakers, educators, and technology providers to address. Ensuring more equitable access to technology and digital literacy education must go hand-in-hand with efforts to leverage screen time for learning.

Social Connection and Support

Another potential benefit of screen time is the opportunity it provides for social connection and support. In an increasingly globalized and digitally-connected world, a significant portion of adolescents' social interaction now occurs through screens. Social media platforms, video chats, instant messaging, and multiplayer gaming all offer ways for teens to connect, share, and bond with their peers [48].

For many adolescents, these digital social spaces provide a valuable sense of belonging and connection. They allow teens to find others who share their interests,

experiences, and identities, regardless of geographic location. An LGBTQ+ teen in a small, conservative town, for example, might find a supportive community online that they lack access to in their daily life. A teen with a rare medical condition can connect with others who understand their unique challenges. Gamers can find teammates and competitors who share their passion. In this way, screen-mediated interaction can help fulfill the fundamental human need for social connection and support [28].

Moreover, digital communication can help maintain important relationships with friends and family who are geographically distant. For teens whose loved ones live far away, regular video chats and instant messages can be a lifeline, allowing them to share their daily experiences and maintain a sense of closeness [28]. This has been particularly relevant during the COVID-19 pandemic, when physical distancing measures have limited in-person interaction for many people.

Of course, it's essential to recognize that online social interaction is not a complete substitute for face-to-face connection. In-person communication provides unique benefits, such as the ability to read nonverbal cues, the physical comfort of a hug, or the shared experience of an activity. Some research suggests that while screen-based interaction can supplement or maintain existing relationships, it may be less effective at fostering new, deep connections [44].

Additionally, social media and other online social spaces come with their own set of risks and challenges. The pressure to present a curated, "perfect" version of oneself, the constant social comparison, the risk of cyberbullying - these factors can take a toll on adolescents' mental health and well-being [45]. It's crucial for teens to develop the skills to navigate these spaces in a healthy way, such as learning to critically evaluate the images and messages they encounter, setting boundaries around their screen use, and seeking help when needed.

A balanced approach, one that includes both face-to-face and screen-mediated socialization, is likely to be most beneficial for adolescents' social development and well-being [44]. By providing guidance and support, parents and educators can help teens harness the connective power of technology while also developing the skills for healthy in-person relationships.

Creativity and Self-Expression

A third area where screen time can offer benefits is in the realm of creativity and self-expression. Digital technologies provide a multitude of tools and platforms for adolescents to create, express themselves, and share their ideas with the world. From digital art and music production to blogging and video creation, the possibilities for creative output are vast [24].

For many adolescents, engaging in creative pursuits through technology can be a deeply empowering and validating experience. It allows them to experiment with different identities, perspectives, and modes of expression, which is a key part of identity development [24]. A shy teen who struggles to speak up in class might find their voice through writing fan fiction stories. A budding filmmaker can hone their craft by creating and sharing short videos. A teen with a quirky sense of humor can find an appreciative audience through a meme account.

Moreover, the act of creating and sharing can foster a sense of agency, self-efficacy, and community. When adolescents receive positive feedback and recognition for their creative work, it can boost their confidence and motivation [25]. Engaging with others who appreciate and build upon their creations can provide a sense of purpose and connection.

The skills and competencies developed through creative digital pursuits can also be transferable to other domains. Learning to code in order to build a gaming mod, for example, can spark an interest in computer science as a career path. Developing a following as a beauty vlogger can translate into valuable communication and entrepreneurial skills.

However, it's important to recognize that the digital world can also present challenges and pressures for young creators. The constant stream of content and the pressure to gain followers and likes can be overwhelming and can lead to burnout [49]. The anonymity of the internet can also enable harsh criticism and even harassment, which can be deeply discouraging and damaging to adolescents' self-esteem .

As with other aspects of screen time, a balanced approach is key. Adolescents need

guidance and support to navigate the creative opportunities and challenges of the digital landscape in a healthy way. This might involve setting boundaries around screen time, encouraging a focus on the intrinsic joys of the creative process rather than external validation, and fostering resilience in the face of negative feedback [50].

Strategies for Promoting Healthy Screen Time Habits

Given the complex mix of potential risks and benefits associated with screen time, the question

arises: how can we help adolescents navigate this digital landscape in a way that maximizes the positive and minimizes the negative impacts? This section will explore some strategies that parents, educators, and adolescents themselves can employ to promote healthy screen time habits.

The Role of Parents

Parents play a crucial role in shaping their children's relationship with screens. They are the primary models for technology use in the home, and their attitudes, rules, and communication around screen time can have a significant impact on their children's habits [51].

One key strategy for parents is to establish clear guidelines and boundaries around screen time. This might involve setting limits on the amount of time spent on screens each day, designating screen-free zones or times (such as during meals or before bedtime), and establishing rules around the types of content that are appropriate [49]. It's important that these guidelines are age-appropriate, consistently enforced, and regularly reviewed as the child grows and their needs change.

However, simply setting rules is not enough. It's also crucial for parents to have ongoing, open conversations with their children about their screen use. This includes discussing the potential risks and benefits, helping them critically evaluate the content they encounter, and encouraging them to reflect on their own habits and emotions related to screens . By fostering a climate of openness and trust, parents can help their children develop the skills to self-regulate their screen use and make informed decisions.

Importantly, parents also need to model healthy screen habits themselves. Children are highly attuned to their parents' behaviours, and are more likely to internalize the habits they observe [49]. If a parent regularly scrolls through their phone during dinner or binge-watches shows late into the night, it sends a powerful message to their child about the role of screens in daily life.

Finally, parents can proactively encourage and facilitate non-screen activities. This might involve enrolling children in sports or hobbies, planning regular outdoor excursions, or instituting family game nights [49]. By filling their children's lives with engaging, fulfilling offline activities, parents can help reduce the pull of screens and promote a more balanced lifestyle.

The Role of Schools

Schools also have an important part to play in promoting healthy screen habits. As the primary setting for adolescents' academic and social development, schools can shape both the quantity and quality of students' screen time [52].

One approach schools can take is to integrate digital literacy education into the curriculum. This involves teaching students the skills to critically evaluate online content, understand digital privacy and security, and navigate social media in a healthy way [53]. By empowering students with these skills, schools can help them become more discerning and self-aware in their screen use.

Schools can also implement policies to manage screen time during the school day. This might involve rules around phone use during class, filtering software on school computers, or designated "tech-free" spaces [54]. However, it's important that these policies are not overly restrictive, and that they are balanced with efforts to harness technology for learning. Banning phones outright, for example, might prevent students from using them for harmful purposes, but it also eliminates the potential for using them as educational tools.

Schools can also promote healthy screen habits by providing ample opportunities for offline learning and socialization. This might involve incorporating more hands-on, experiential learning activities, promoting extracurricular activities and clubs, or

organizing social events that encourage face-to-face interaction [55].

Ultimately, schools need to strike a balance between leveraging the benefits of technology for education and mitigating the potential harms of excessive or inappropriate use. This requires ongoing dialogue and collaboration among administrators, teachers, technology staff, and students to develop policies and practices that are effective, equitable, and responsive to the evolving digital landscape [56].

Individual Strategies for Adolescents

While parents and schools play crucial roles in shaping adolescents' screen habits, ultimately, adolescents themselves need to develop the skills and self-awareness to manage their own screen time in a healthy way. Here are some strategies that adolescents can employ:

1. Self-monitoring: Keeping track of one's own screen time can be a powerful first step. There are many apps available that can automatically track and report on screen time, breaking it down by app and activity [57]. Simply being aware of how much time one is spending on screens can be eye-opening and can motivate change.

2. Goal-setting: Based on this self-awareness, adolescents can set personal goals for their screen time. This might involve setting limits on total daily screen time, designating specific times of day as screen-free, or setting a goal to spend a certain amount of time on offline activities each day [58].

3. Mindfulness: Practicing mindfulness can help adolescents become more aware of their emotions and impulses related to screens. They might ask themselves, "Why do I feel the urge to check my phone right now? What am I hoping to feel or avoid feeling?" By bringing a curious, non-judgmental awareness to these internal experiences, adolescents can start to develop greater control over their screen habits [59].

4. Finding balance: Adolescents can proactively seek out offline activities that bring them joy, meaning, and social connection. This might involve pursuing

hobbies, spending time in nature, volunteering, or investing in face-to-face friendships [60]. By cultivating a rich offline life, the pull of screens may naturally diminish.

5. Seeking support: Finally, adolescents shouldn't hesitate to seek support if they're struggling to manage their screen time. This might involve talking to a trusted adult, joining a support group, or even seeking professional help if screen use is significantly interfering with daily functioning [61].

By developing these personal strategies and skills, adolescents can take ownership of their screen habits and set themselves up for long-term digital well-being.

RECENT STUDIES:

Study by Wiguna T et al. (2024): Impact of Screen Time on Behavioural and Emotional Issues During COVID-19

Wiguna T et al. (2024) conducted a study to examine the effect of screen time on behavioural and emotional challenges among Indonesian adolescents across three phases of the COVID-19 pandemic: pre-peak, peak, and post-peak. Data collection was carried out using an online community mental health survey. The survey integrated the Youth Screen Time Survey to measure screen usage and the Strengths and Difficulties Questionnaire (adolescent version) to assess emotional, conduct, and prosocial behaviour issues.

The participants included secondary and senior high school students, with sample sizes of 337, 423, and 1,096 during the pre-, peak-, and post-pandemic periods, respectively. Daily average screen time was analyzed and compared across these periods. Additionally, odds ratios were calculated to determine the relationship between screen time and mental health outcomes during each phase. The findings revealed significant variations in daily average screen time among adolescents across the different pandemic phases. Notably, reduced screen time was linked to fewer emotional, conduct, and prosocial behaviour problems, particularly during the peak phase of the pandemic. These results underscore the importance of incorporating psychoeducation on screen time as part of mental health interventions for adolescents.[62]

Study by Ahmed I et al. (2024): Association of Screen Time with Eating Habits, BMI, and Academic Performance in Children

Ahmed I et al. (2024) explored the relationship between excessive screen time and eating behaviours, body weight (as indicated by body mass index), and academic performance among school-aged children in the NCR region. The research employed a pre-validated questionnaire-based approach, utilizing the Adolescent Sedentary Activity Questionnaire (ASAQ), the Food Frequency Questionnaire (FFQ), and a Likert scale to assess academic performance. Body mass index was also calculated. Screen time data were analyzed based on the guidelines set forth by the Indian Academy of Pediatrics (IAP).

The study found that 383 participants (73.8%) engaged in screen use on a typical weekday, with 229 (44.1%) reporting screen use during meals. Among the overweight participants, 90 (77.5%) had a screen time of more than two hours, while only two (1.7%) overweight participants had no screen exposure. Furthermore, 184 children (36.1%) with over two hours of screen time achieved an average grade of 76.6%, compared to an average grade of 91.5% in children with no screen exposure. These findings highlight the negative association between excessive screen time and both academic performance and weight status, emphasizing the need for awareness and interventions targeting screen time reduction in children.[63]

Review by Priftis N et al. (2023): Health Impacts of Excessive Screen Time in Children and Adolescents

Priftis N et al. (2023) conducted a narrative review to document the health consequences of excessive screen time (ST) among children and adolescents. The review considered 43 original articles from various databases. The findings highlighted that excessive screen time was associated with an elevated risk of obesity, cardiometabolic complications, mental health disorders, unhealthy dietary patterns, eating disorders, developmental challenges, and disruptions in child-parent relationships. Additionally, adverse effects were observed on sleep quality, physical activity levels, vision, headache prevalence, and the musculoskeletal system.

The impact of screen time was influenced by the type of media consumed and the manner of its usage, with other confounding factors also playing a role. Although the review indicated a negative correlation between excessive screen time and youth health, it emphasized the need for further research to confirm and clarify these associations.[64]

Study by Patel M et al. (2022): Screen Time and Academic Performance Among Adolescents

Patel M et al. (2022) investigated the relationship between screen time and academic performance through a community-based descriptive cross-sectional study involving 301 adolescents aged 10–18 years. Conducted between January 2020 and December 2021, the study employed a pilot-tested semi-structured questionnaire to gather demographic and screen time data. The initial pilot phase included healthy adolescents visiting the pediatric clinic at GMH in Rewa, Madhya Pradesh, and the study was later expanded to schools in Rewa County.

Among the participants, 35% belonged to the early adolescent group (10–13 years), 58% to the middle adolescent group (14–16 years), and 7% to the late adolescent group (17–18 years). The findings revealed that the average grades decreased with increased screen time. Adolescents with screen time exceeding three hours per day achieved an average grade of 62.1%, whereas those who refrained from using screen media achieved an average grade of 88.4%. This difference was statistically significant, with a p-value of <0.001. The study underscores the negative impact of excessive screen use on academic performance and advocates for limiting screen time among adolescents.[65]

Study by Paulich KN et al. (2021): Associations Between Screen Time and Behavioural Outcomes

Paulich KN et al. (2021) analyzed data from the Adolescent Brain Cognitive Development Study (ABCD Study®), which included a nationwide sample of 11,875 participants aged 9–10 years in the United States. Using correlation and regression analyses, the study investigated the relationships between screen time and mental health, behavioural problems, academic performance, sleep patterns, and peer relationships, while controlling for socioeconomic status (SES) and race/ethnicity.

The findings indicated that increased screen time was moderately associated with poorer mental health, heightened behavioural issues, lower academic performance, and disrupted sleep. Interestingly, screen time was linked to improved peer relationships, potentially due to the role of social media in fostering social connectivity. Despite these findings, the effect sizes of screen time on various outcomes were modest, and SES emerged as a stronger determinant for these measures. The study cautioned against interpreting screen time as directly harmful to children aged 9–10 years and highlighted the need for more nuanced investigations to establish causality.[66]

Study by Adelantado-Renau M et al. (2019): Screen-Based Activities and Academic Performance in Children and Adolescents

Adelantado-Renau M et al. (2019) conducted a systematic review and meta-analysis to investigate the relationship between screen-based activities and various areas of academic performance among children and adolescents. The review included 58 cross-sectional studies out of a total of 5599 articles, with 30 studies incorporated into the meta-analysis. The systematic review involved 480,479 participants aged 4 to 18 years, with sample sizes ranging from 30 to 192,000 per study. The meta-analysis encompassed 106,653 participants, with study sizes ranging from 70 to 42,041 individuals.

The findings showed that overall screen media usage was not significantly associated with academic performance (effect size [ES] = −0.29; 95% CI, −0.65 to 0.08). However, specific screen-based activities demonstrated adverse effects on academic outcomes. Television viewing was inversely associated with composite academic performance scores (ES = −0.19; 95% CI, −0.29 to −0.09), language performance (ES = −0.18; 95% CI, −0.36 to −0.01), and mathematics performance (ES = −0.25; 95% CI, −0.33 to −0.16). Similarly, video game playing was negatively linked to composite academic performance scores (ES = −0.15; 95% CI, −0.22 to −0.08).

Subgroup analyses revealed that television viewing was inversely associated with language skills specifically in children (ES = −0.20; 95% CI, −0.26 to −0.15), while both television viewing (ES = −0.19; 95% CI, −0.30 to −0.07) and video game playing (ES = −0.16; 95% CI, −0.24 to −0.09) were linked to poorer composite scores

in adolescents. The study highlights the need for targeted interventions to address specific screen-based activities and their impact on academic performance.[67]

Study by Parent J et al. (2016): Screen Time, Sleep, and Behavioural Health Problems

Parent J et al. (2016) investigated the indirect impact of youth screen time on behavioural health problems, including internalizing, externalizing, and peer-related issues, mediated by sleep duration and disturbances. The study examined a community sample of parents with children in three developmental stages: young childhood (3–7 years, N = 209), middle childhood (8–12 years, N = 202), and adolescence (13–17 years, N = 210). Path analysis was used to test the proposed indirect effect model.

The results demonstrated that increased screen time, irrespective of the child's developmental stage, was associated with greater sleep disturbances. These sleep disruptions, in turn, were linked to higher levels of behavioural health problems in youth. The findings underscore the critical role of healthy sleep patterns in mitigating the negative behavioural effects associated with excessive screen usage. By addressing both screen time and sleep disturbances, interventions can more effectively promote behavioural health in children and adolescents.[68]

MATERIALS AND METHODS

MATERIAL AND METHODS

Study design: Cross-sectional study, school based

Study Place: Schools in NCR (National Capital Region)

Minimum Sample Size Required: 369 Students (with 95% confidence interval and 5% margin of error)

Sampling Frame: Students from age 14 to 16 years from urban schools of Ghaziabad

Used Formula: $n = [DEFF*Np(1-p)]/ [(d^2/Z^2_{1-\alpha/2}*(N-1)+p*(1-p)]$

Ethical Clearance: Ethical clearance was taken from the ethical committee at Santosh Medical College and Hospital, Ghaziabad.

Inclusion Criteria:

- All school going students of either sex from age 14 to 16 yrs. (8-10 Class)

Exclusion Criteria:

- Any adolescent with disability and chronic disease
- Student having less than 15 min of screen time
- Student with history of mental disease.
- Student with history of mental disease in family.
- Student whose parents do not give consent.

METHOD OF DATA COLLECTION

- Consent was taken, and a questionnaire (Strengths and Difficulties Questionnaire) was administered.
- Data were collected from the students' school after obtaining permission from both parents and school authorities.
- The result of each student's latest terminal examination was documented.
- Each student was provided with a questionnaire to collect basic demographic information such as age, sex, parental education level, and details related to screen time.
- Academic performance data from the previous semester were obtained from the school authority, specifically the class teacher.
- The SDQ scale questionnaire was completed by the students to assess their behavioural and emotional characteristics.
- The Brief Psychiatric Rating Scale for Children (BPRS-C) questionnaire was also filled out by the students.

The administered questionnaire collected data on the following:

- Name and age of the student
- Sex of the student
- Class/grade in which the student was enrolled
- Result of the most recent terminal examination
- Average daily screen time
- Responses to the BPRS-C scale
- Responses to the SDQ (Strengths and Difficulties Questionnaire)

STATISTICAL ANALYSIS:

The data were initially checked for completeness, and data was cleaned for errors and missing values. The corrected data was then entered into Microsoft Excel after preparing a Master-chart. Data analysis was done using licensed SPSS software version 24.0 (Chicago, Illinois). Univariate analyses was done initially and the results were presented with the help of tables,. Descriptive statistics were used to calculate frequencies of categorical variables, and measures of central tendencies and dispersion were used to describe continuous variables. Anova test were used to compare the continuous variable and chi-square test was used for categorical variables. A p-value <0.05 was considered as statistically significant.

ETHICAL ISSUES:

Approval from Institutional Ethical Committee of the hospital was taken before the start of the study. Written and informed consent taken from the participants before proceeding the study. Each eligible subject was explained about the purpose of the study by the investigator and an informed consent was obtained, prior to inclusion. They were assured of complete confidentiality of information, and the option of withdrawing from the study at any point of time. The study did not involve any method that puts the subjects, family members or the investigator at risk.

OBSERVATIONS
&
RESULTS

OBSERVATIONS & RESULTS

Table 1**: Age (years)** distribution of the study participants:

Age	No. of Participants	Percent
14yrs 11months	4	1.1
15yrs 11months	263	71.3
16yrs 11months	102	27.6
Total	369	100.0

Out of 369 participants, the majority—263 (71.3%)—were aged 15 years 11 months, followed by 102 (27.6%) aged 16 years 11 months. Only 4 participants (1.1%) were aged 14 years 11 months. The mean age of the study population was 15.27 ± 0.47 years. Mean – 15.27 yrs + - 0.466 yrs

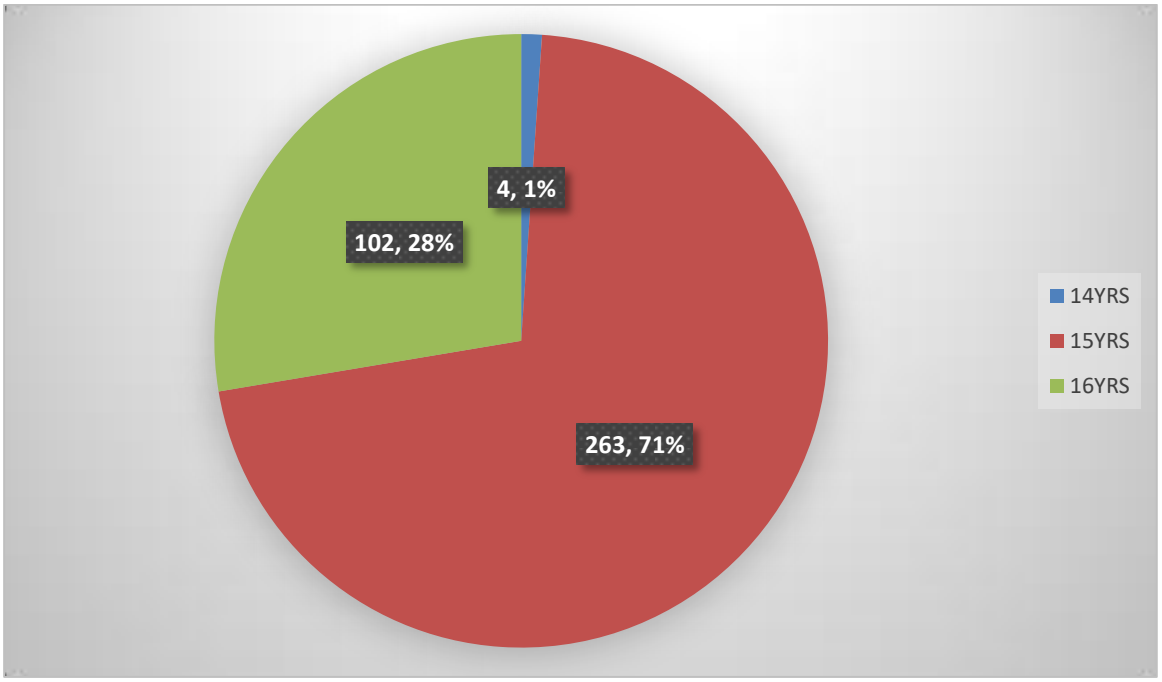


Table 2: Distribution of study participants according to **gender**

	No. of Participants	Percent
Female	196	53.1
Male	173	46.9
Total	369	100.0

Among the participants, 196 (53.1%) were female and 173 (46.9%) were male, indicating a slight female predominance in the sample.

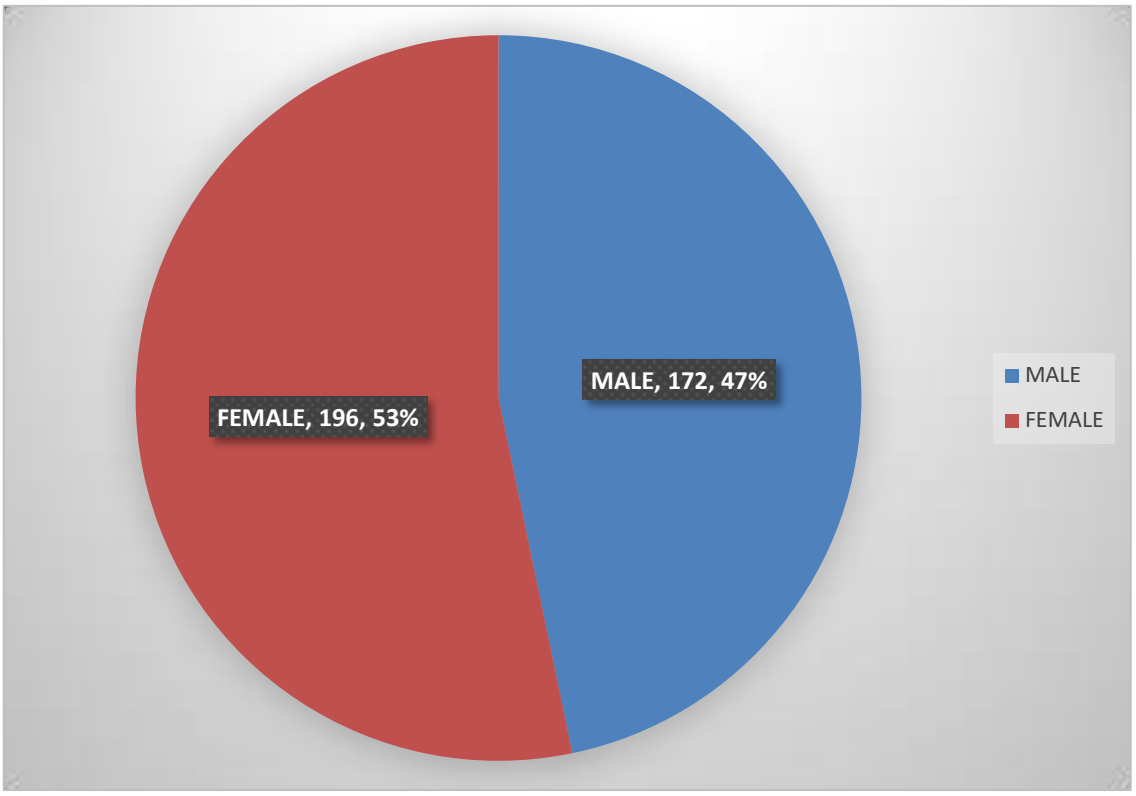


Table 3: Distribution of study participants according to **class** in which they are studying

Class	No. of Participants	Percent
9th	45	12.2
10th	324	87.8
Total	369	100.0

Most of the students were in the 10th class (87.8%), while only 45 (12.2%) were in the 9th class.

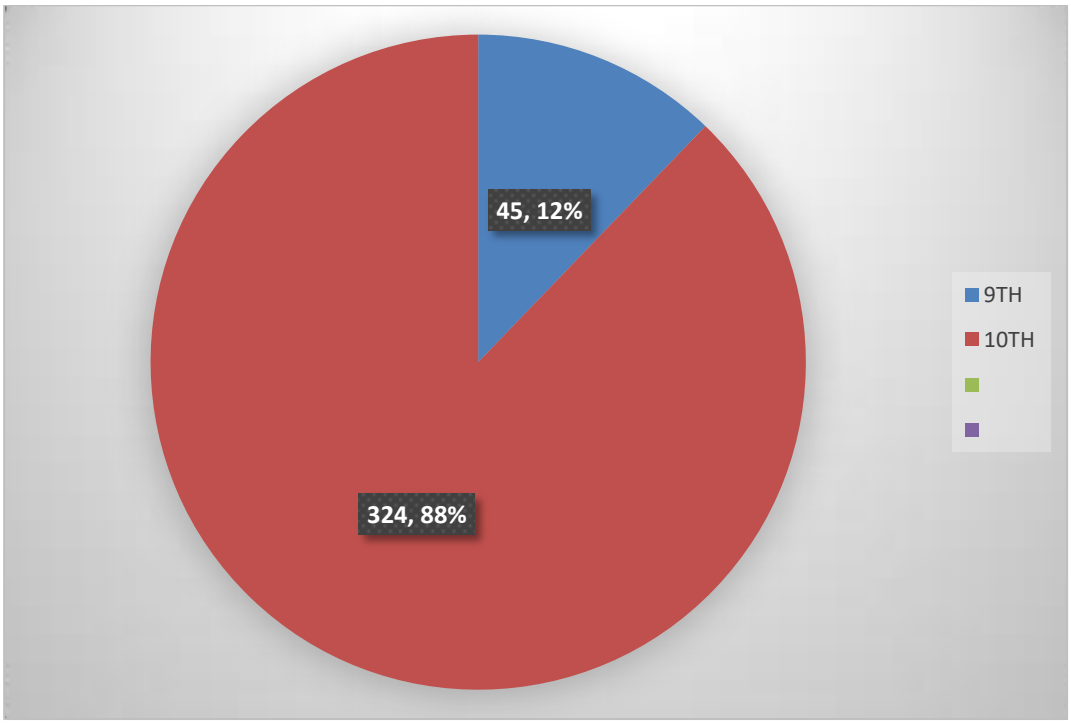


Table 4: Distribution of students according to their **average screen time**

Average Screen Time	No. of Participants	Percent
5 hr-7hr 59 min	157	42.5
8hr-10hr 59 min	102	27.6
11hr-14hr 59 min	87	23.6
>=14hr	23	6.2
Total	369	100.0

Out of 369 students, 157 (42.5%) reported screen time between 5–7 hrs 59 mins, 102 (27.6%) had 8–10 hrs 59 mins, 87 (23.6%) had 11–13 hrs 59 mins, and 23 (6.2%) had ≥14 hrs. The mean screen time was 8.83 ± 2.78 hours.
Mean – 8.83 hrs + - 2.780 hrs

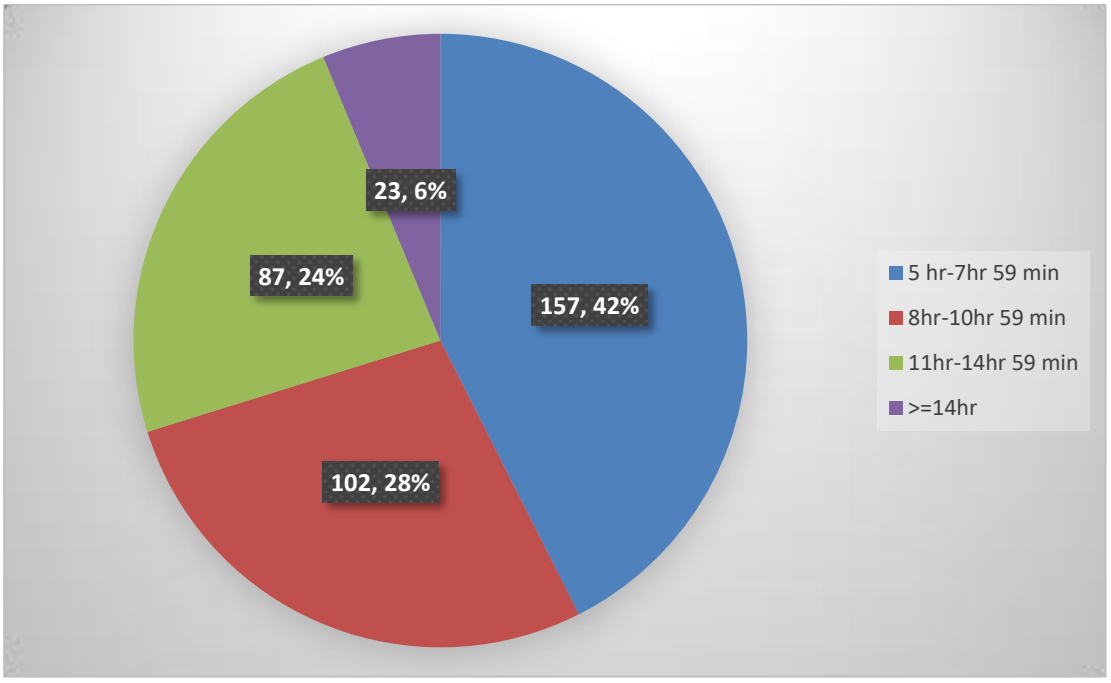


Table 5 : Distribution of **last semester score** of the study participants

Percentage	No. of Participants	Percent
50%-70%	150	40.7
71%-90%	203	55.0
>=91%	16	4.3
Total	369	100.0

Most students (55.0%) scored between 71–90%, 40.7% scored 50–70%, and only 4.3% scored ≥91%. The mean academic score was 75.95 ± 10.66%.
Mean – 75.95 % + - 10.663 %

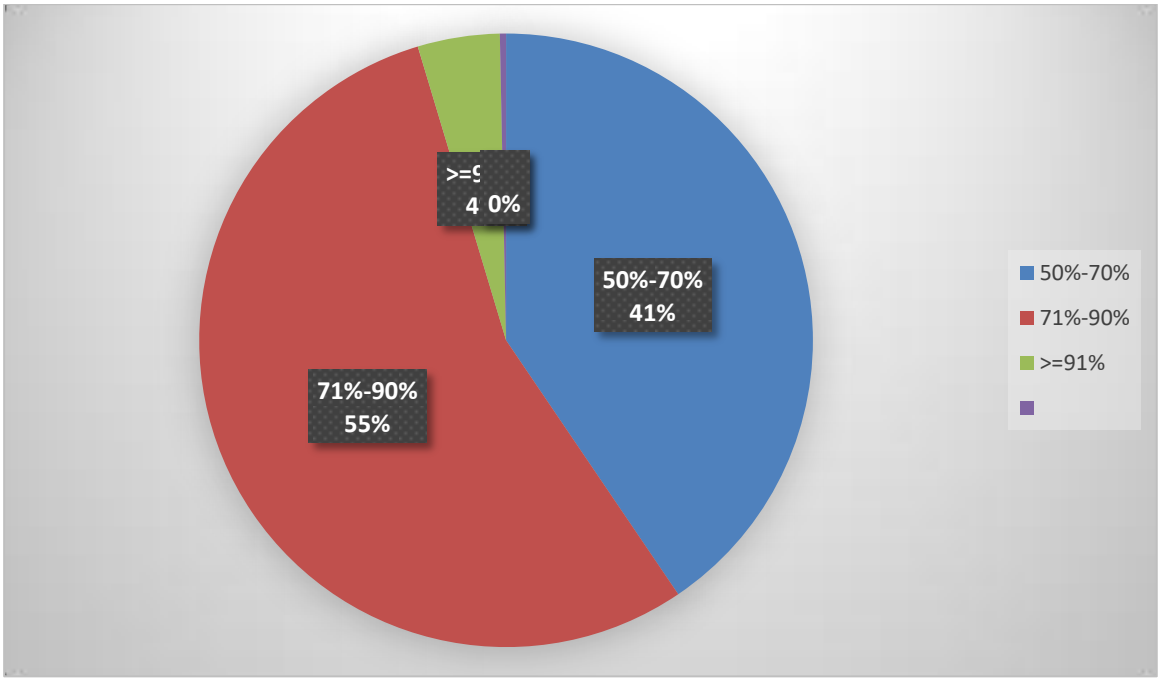


Table 6:- Distribution of **Total difficulty score** of the study participants

Score	No. of Participants	Percent
0-15 (The score is close to average)	63	17.1
16-19 (The score is slightly raised)	140	37.9
20-40 (The score is high)	166	45.0
Total	369	100.0

Of the total, 166 (45.0%) had a high difficulty score (20–40), 140 (37.9%) had slightly raised scores (16–19), and 63 (17.1%) had scores close to average (0–15). The mean score was 19.58 ± 3.86.

Mean – 19.58 + - 3.864

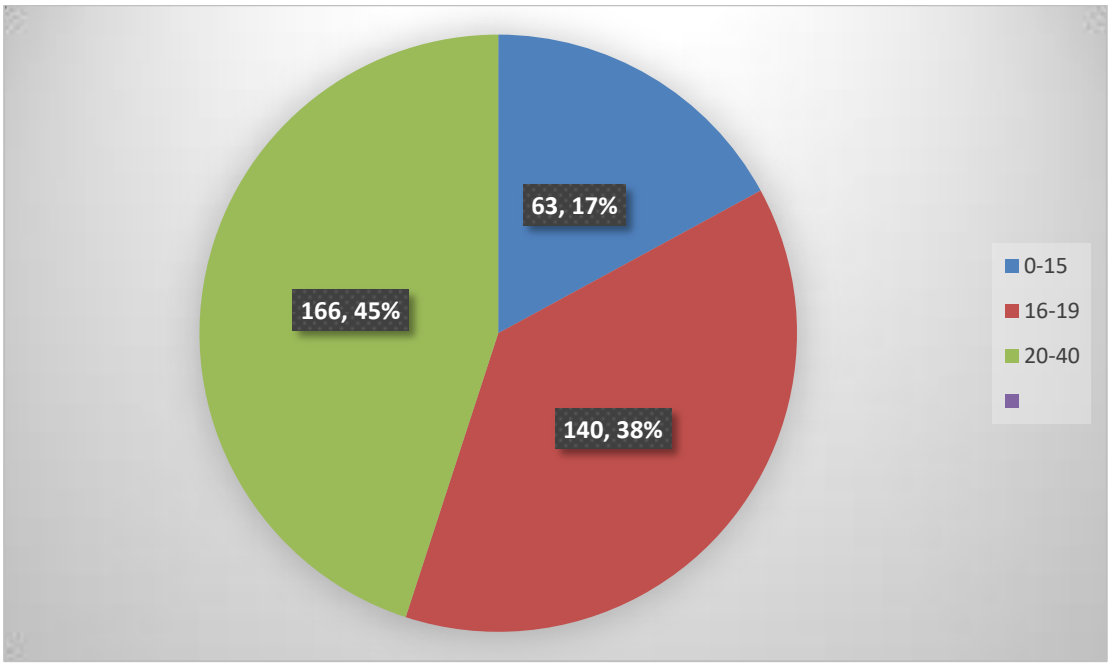


Table 7:- Distribution of **Emotional Symptoms Score** of study participants.

Score	No. of Participants	Percent
0-5 (This score is close to average)	251	68.0
6 (This score is slightly raised)	63	17.1
7-10 (This score is high)	55	14.9
Total	369	100.0

Mean -4.75 + - 1.377

Most participants (68.0%) had scores close to average (0–5), 17.1% had slightly raised scores (6), and 14.9% had high emotional symptoms scores (7–10). The mean was 4.75 ± 1.38.

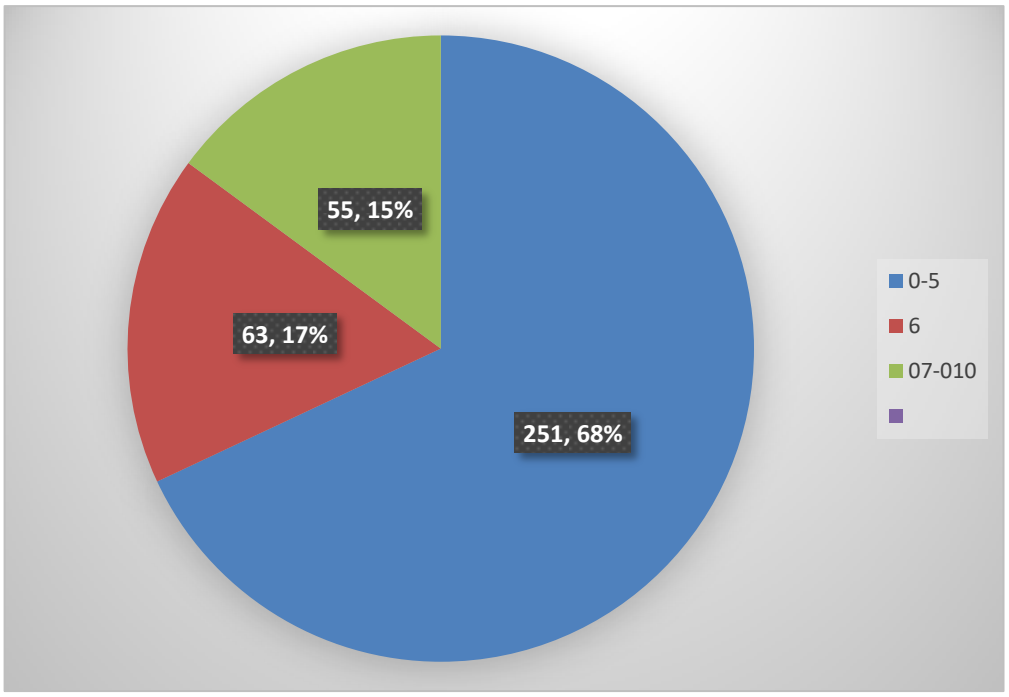


Table 8:- Distribution of **Conduct Problem Score** of study participants.

Score	No. of Participants	Percent
0-3 (This score is close to average)	259	70.2
4 (This score is slightly raised)	63	17.1
5-10 (This score is high)	47	12.7
Total	369	100.0

Mean - 3.00 + - 1.053

A total of 259 (70.2%) participants had scores within the normal range (0–3), 17.1% had slightly raised scores (4), and 12.7% had high scores (5–10). The mean was 3.00 ± 1.05.

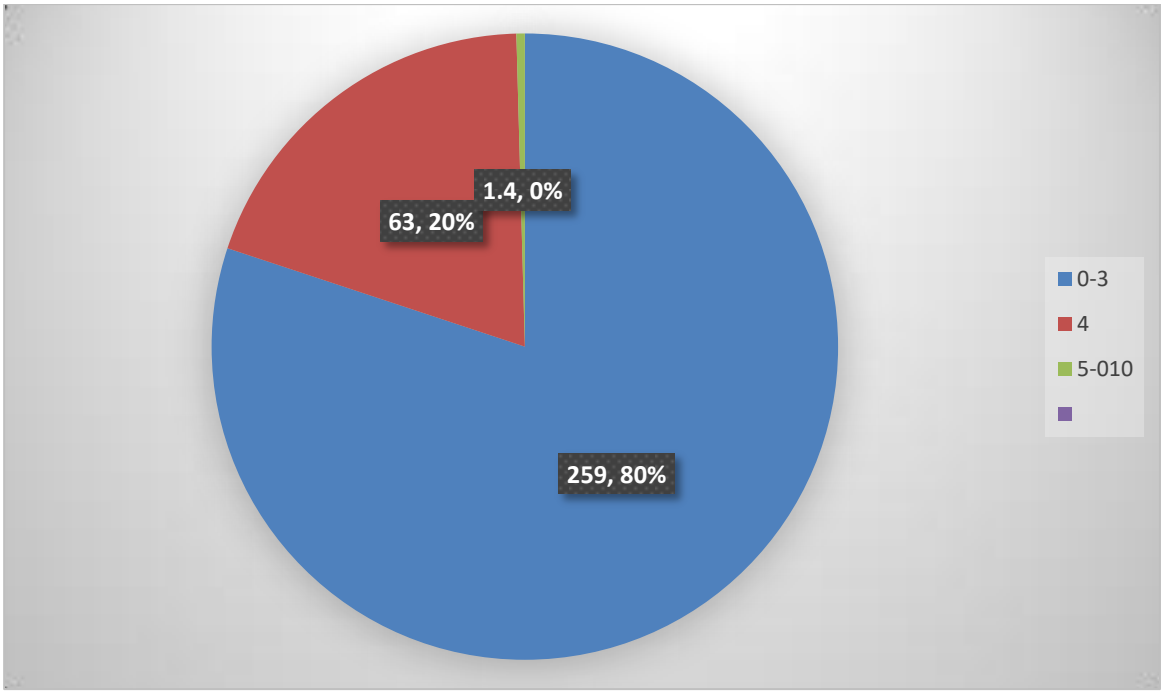


Table 9 :- Distribution of **Hyper Activity Score** of study participants

Score	No. of Participants	Percent
0-5 (This score is close to average)	235	63.7
6 (This score is slightly raised)	32	8.7
7-10 (This score is high)	102	27.6
Total	369	100.0

Mean - 4.74 + - 2.180

Out of 369 participants, 235 (63.7%) had scores within the average range (0–5), 8.7% had slightly raised scores (6), and 27.6% had high scores (7–10). The mean score was 4.74 ± 2.18.

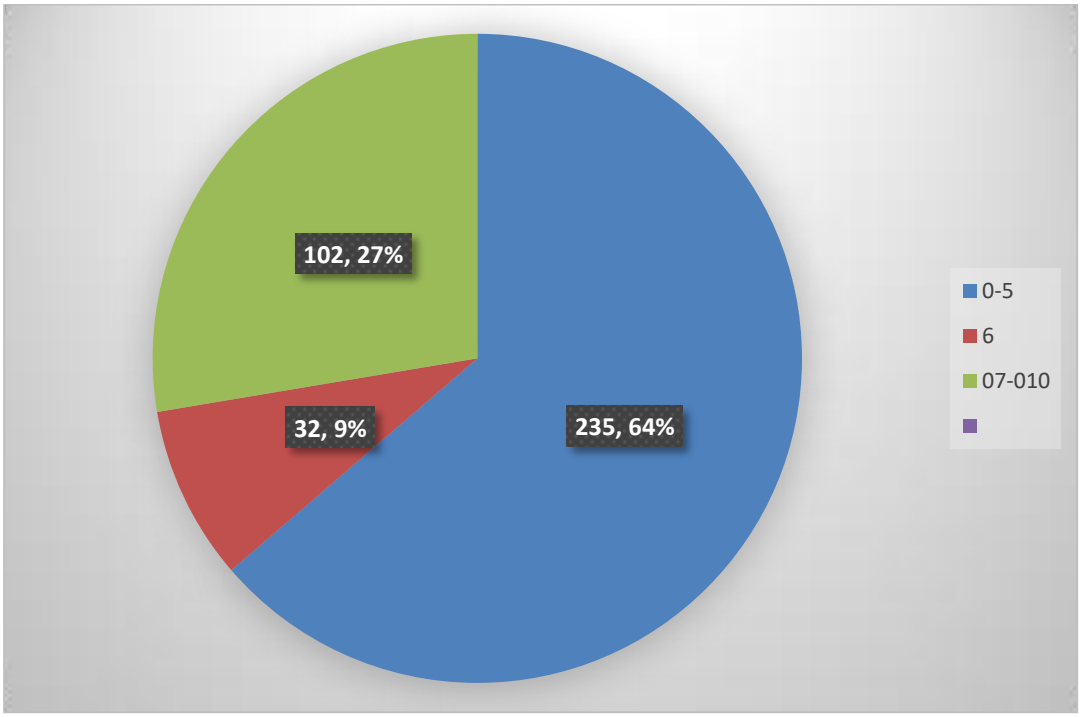


Table 10 :- Distribution of **Peer Problem Score** of study participants

Score	No. of Participants	Percent
0-3 (This score is close to average)	369	100.0

Mean – 1.85 + - 0.799

All participants (100%) had peer problem scores within the normal range (0–3), with a mean of 1.85 ± 0.80.

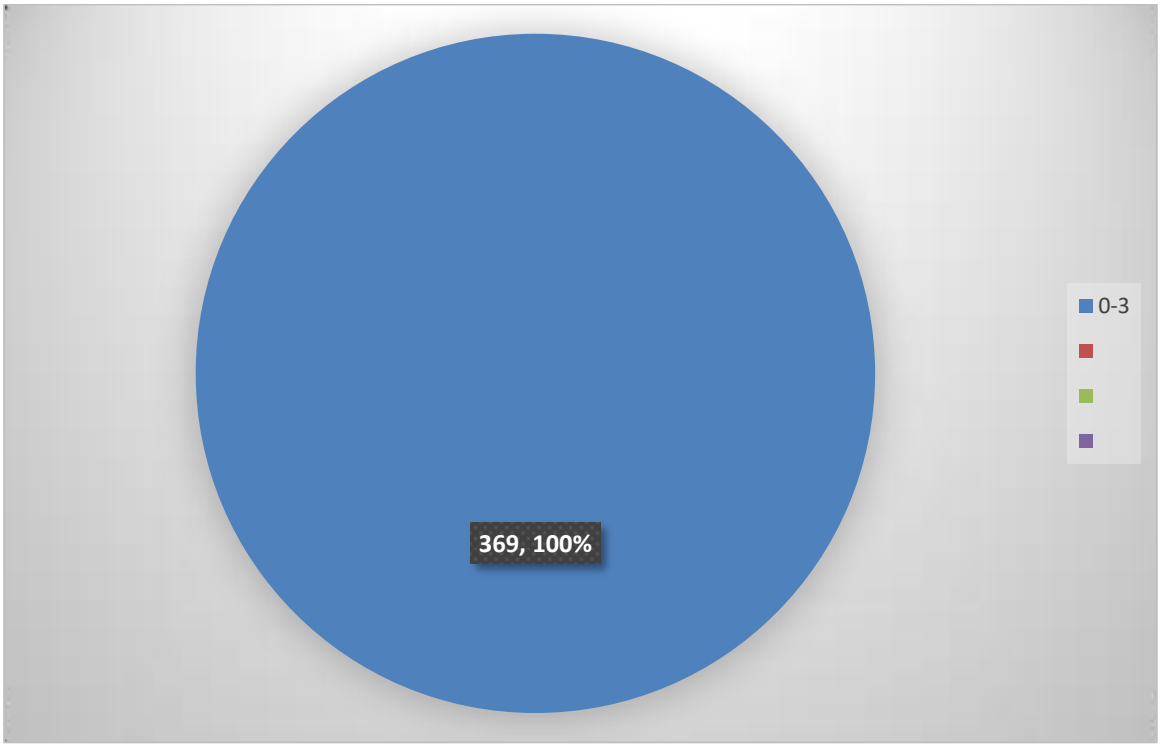
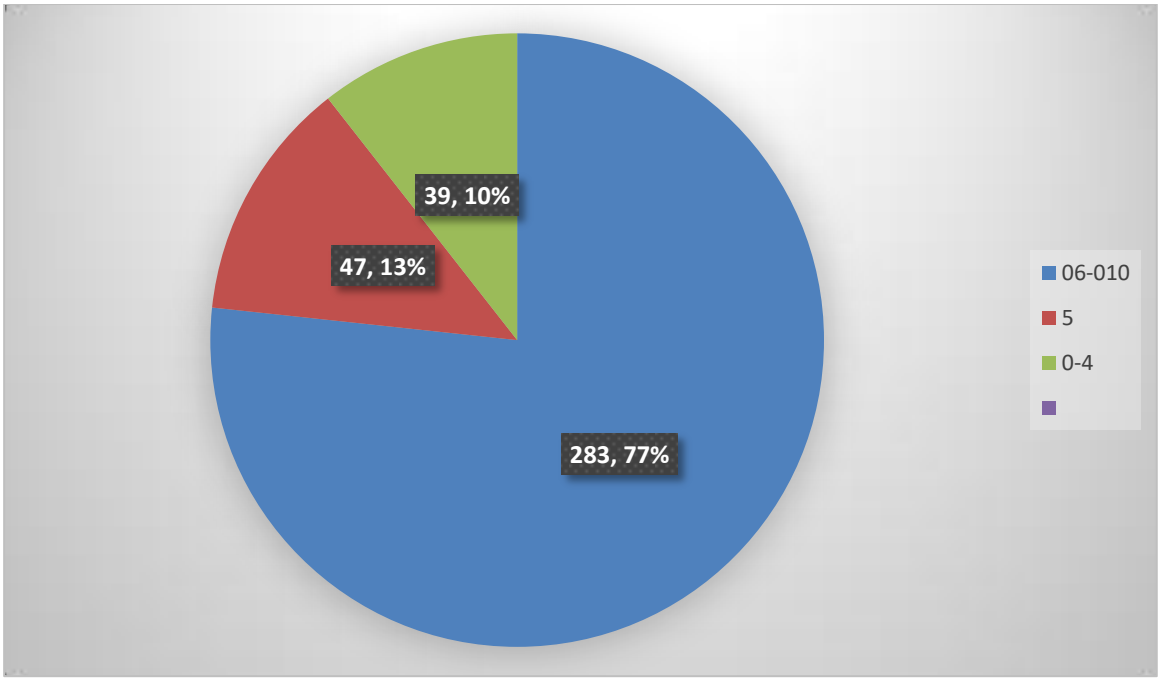


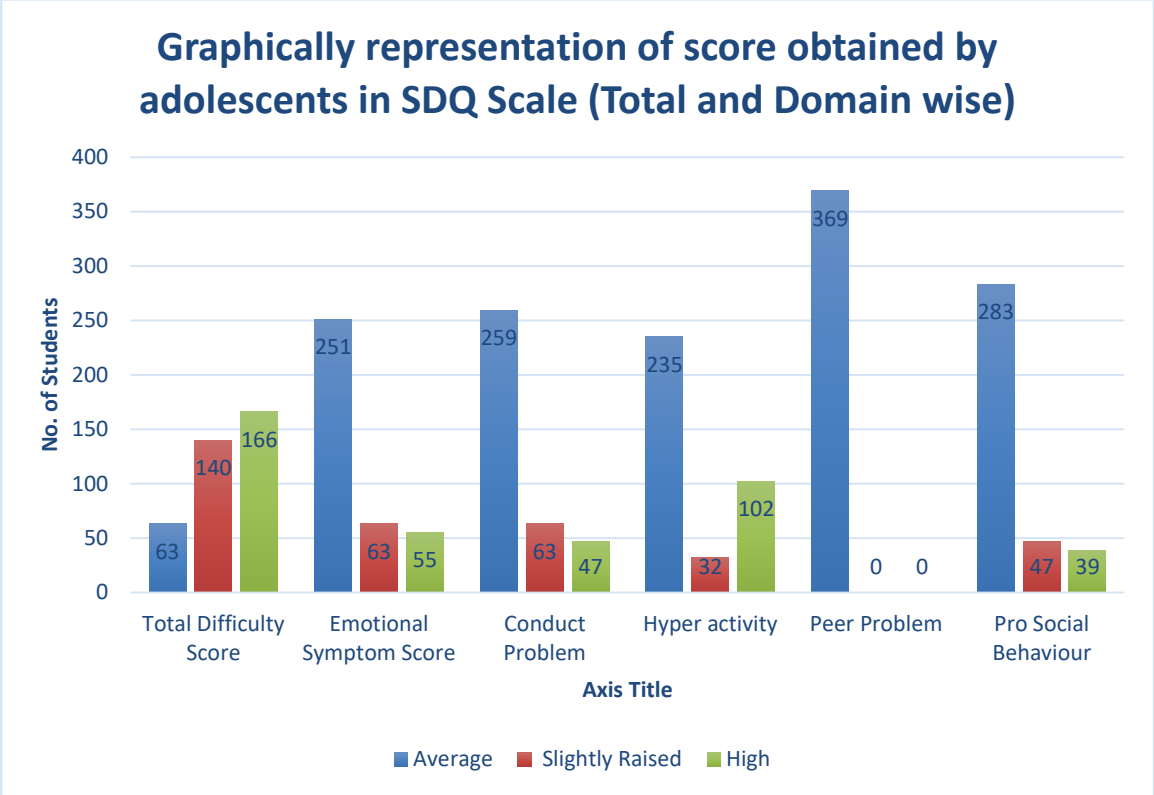
Table 11 :- Distribution of **Pro Social Behaviour Score** of study participants

Score	No. of Participants	Percent
6-10 (This score is close to average)	283	76.7
5 (This score is slightly raised)	47	12.7
0-4 (This score is high)	39	10.6
Total	369	100.0

Mean – 6.92 + - 1.647

Most participants (76.7%) had normal scores (6–10), 12.7% had slightly lowered scores (5), and 10.6% had significantly low scores (0–4). The mean score was 6.92 ± 1.65.





There Mental well being has also been studied for 369 adolescent students and it has also noted that, there is only 17% who were maintaining there well being , while there were 38% whose mental well being is becoming questionable , it means there well being is challenged. Approx. 45% adolescents well being is significantly affected which is matter of concern

Table 12 :- Distribution of **BPRS-C Score** of study participants

Score	No. of Participants	Percent
0-10 (None / very Mild)	24	6.5
11-31 (Mild)	330	89.4
32-52 (Moderate)	15	4.1
Total	369	100.0

Mean – 18.63 + - 7.053

A majority of students (89.4%) scored in the mild range (11–31), 6.5% had none/very mild symptoms (0–10), and 4.1% had moderate symptoms (32–52). The mean score was 18.63 ± 7.05.

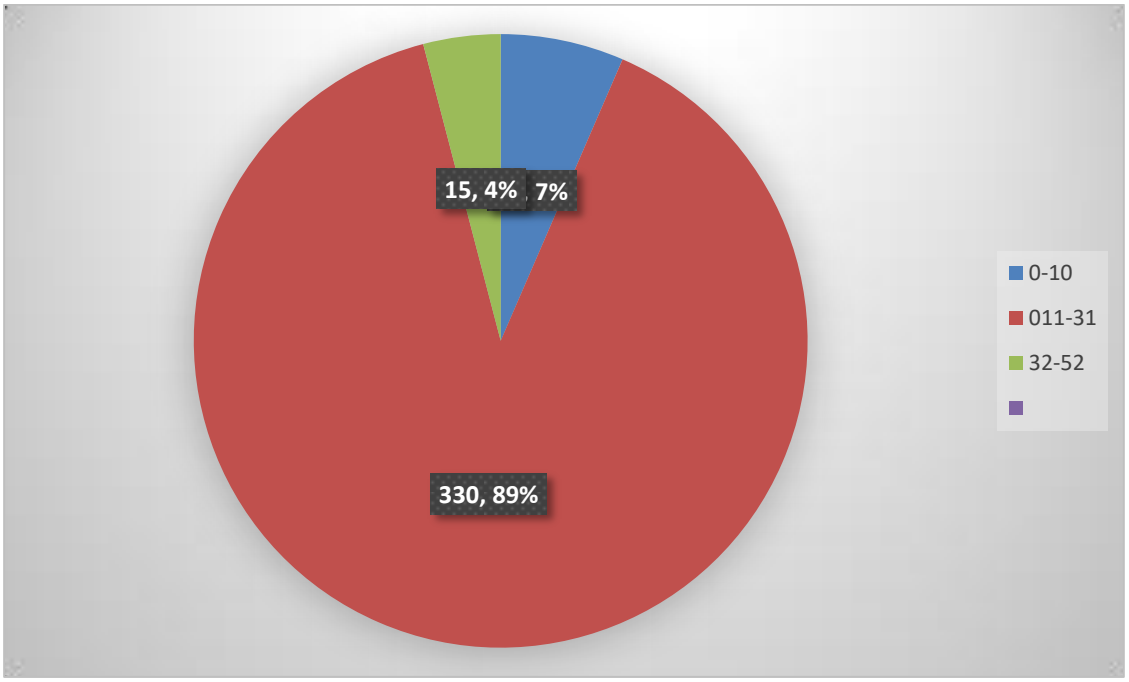


Table 13 :- **Gender** wise comparison of **average screen time**

Gender	Average Screen Time				
	5hrs-7hrs 59min	8hrs-10hrs 59min	11hrs-13hrs 59min	>=14hrs	Total
Female	157 (80.1%)	39 (19.9%)	0 (0.0%)	0 (0.0%)	196 (100%)
Male	0 (0.0%)	63 (36.4%)	87 (50.3%)	23 (13.3%)	173 (100%)
Total	157 (42.5%)	102 (27.6%)	87 (23.6%)	23 (6.2%)	369 (100%)

p value – 0.0001

A significant gender-based disparity in screen time, with males exhibiting notably higher average screen time compared to females. While the vast majority of females fall within the lower screen time range, a substantial proportion of males report extended screen usage, including durations exceeding 11 hours per day which shows the male are prolonging the exposure time which is matter of concern and it has to be managed threw good counseling otherwise in long run if they continue such practice may turn to be harmful in future, especially level of attention , concentration, vigilance, calculation , depth perception and memorization

Table 14 :- Comparison of variable **Average screen time with Total difficulty score**

Average Screen time	Total Difficulty Score			
	0-15 (This score is close to average)	16-19 (This score is slightly raised)	20-40 (This score is high)	Total
5hr-7hr 59min	55 (35.0%)	86 (54.8%)	16 (10.2%)	157 (100%)
8hr-10hr 59min	8 (7.8%)	54 (52.9%)	40 (39.2%)	102 (100%)
11hr-13hr 59min	0 (0.0%)	0 (0.0%)	87 (100%)	87 (100%)
>=14hr	0 (0.0%)	0 (0.0%)	23 (100%)	23 (100%)
Total	63 (17.1%)	140 (37.9%)	166 (45.0%)	369 (100%)

p value – 0.045

As screen time increased, the proportion of students with high difficulty scores (20–40) also increased. All students with ≥11 hours of screen time fell into the high difficulty category. The association was statistically significant (p = 0.045).

Table 15 :- Comparison of variable , **Average screen time with Emotional Symptoms Score**

Average Screen time	Emotional Symptoms Score			
	0-5 (This score is close to average)	6 (This score is slightly raised)	7-10 (This score is high)	Total
5hr-7hr 59min	149 (94.9%)	8 (5.1%)	0 (0.0%)	157 (100%)
8hr-10hr 59min	86 (84.3%)	16 (15.7%)	0 (0.0%)	102 (100%)
11hr-13hr 59min	8 (9.2%)	39 (44.8%)	40 (46.0%)	87 (100%)
>=14hr	8 (34.8%)	0 (0.0%)	15 (65.2%)	23 (100%)
Total	251 (68%)	63 (17.1%)	55 (14.9%)	369 (100%)

p value – 0.002

Students with screen time ≥11 hours had markedly higher emotional symptom scores. A strong association was noted, with the majority of high scorers belonging to the higher screen time categories (p = 0.002).

Table 16 - Comparison of variable, **Average screen time with Conduct problem score**

Average Screen time	Conduct Problem Score			
	0-3 (This score is close to average)	4 (This score is slightly raised)	5-10 (This score is high)	Total
5hr-7hr 59min	157 (100%)	0 (0.0%)	0 (0.0%)	157 (100%)
8hr-10hr 59min	86 (84.3%)	16 (15.7%)	0 (0.0%)	102 (100%)
11hr-13hr 59min	8 (9.2%)	47 (54.0%)	32 (36.8%)	87 (100%)
>=14hr	8 (34.8%)	0 (0.0%)	15 (65.2%)	23 (100%)
Total	259 (70.2%)	63 (17.1%)	47 (12.7%)	369 (100%)

p value – 0.024

All students with <8 hours of screen time had normal scores. In contrast, higher conduct problem scores were seen predominantly in students with screen time ≥11 hours. The association was statistically significant (p = 0.024).

Table 17:- Comparison of variable, **Average screen time with Hyperactivity score**

Average Screen time	Hyper Activity Score			
	0-5 (This score is close to average)	6 (This score is slightly raised)	7-10 (This score is high)	Total
5hr-7hr 59min	149 (94.9%)	0 (0.0%)	8 (5.1%)	157 (100%)
8hr-10hr 59min	78 (76.7%)	24 (23.5%)	0 (0.0%)	102 (100%)
11hr-13hr 59min	0 (0.0%)	8 (9.2%)	79 (90.8%)	87 (100%)
>=14hr	8 (34.8%)	0 (0.0%)	15 (65.2%)	23 (100%)
Total	235 (63.7%)	32 (8.7%)	102 (27.6%)	369 (100%)

p value – 0.054

Students with higher screen time (≥11 hrs) exhibited more hyperactivity symptoms, although the association was not statistically significant (p = 0.054).

Table 18 :- Comparison of variable, **Average screen time with Peer problem score**

Average Screen time	Peer Problem Score			
	0-3 (This score is close to average)	4-5 (This score is slightly raised)	6-10 (This score is high)	Total
5hr-7hr 59min	157 (100%)	0 (0.0%)	0 (0.0%)	157 (100%)
8hr-10hr 59min	102 (100%)	0 (0.0%)	0 (0.0%)	102 (100%)
11hr-13hr 59min	87 (100%)	0 (0.0%)	0 (0.0%)	87 (100%)
>=14hr	23 (100%)	0 (0.0%)	0 (0.0%)	23 (100%)
Total	369 (100%)	0 (0.0%)	0 (0.0%)	369 (100%)

p value – 0.0001

All students had normal peer problem scores across all screen time categories. Although statistically significant (p = 0.0001), this might reflect a consistent range rather than a true variation.

Table 19:- Comparison of variable, **Average screen times with Prosocial behaviour**

Average Screen time	Pro Social Behaviour Score			
	6-10 (This score is close to average)	5 (This score is slightly raised)	0-4 (This score is high)	Total
5hr-7hr 59min	157 (100%)	0 (0.0%)	0 (0.0%)	157 (100%)
8hr-10hr 59min	102 (100%)	0 (0.0%)	0 (0.0%)	102 (100%)
11hr-13hr 59min	16 (18.4%)	47 (54.0%)	24 (27.6%)	87 (100%)
>=14hr	8 (34.8%)	0 (0.0%)	15 (65.2%)	23 (100%)
Total	283 (76.7%)	47 (12.7%)	39 (10.6%)	369 (100%)

p value – 0.031

Normal pro-social behaviour (6–10) was observed only in students with <11 hours of screen time. High screen time (≥11 hrs) was associated with lower pro-social scores. The association was significant (p = 0.031).

Table 20:- Comparison of variable, **Average screen time with BPRS-C score**

Average Screen time	BPRS-C Score				
	0-10 (None/Very Mild)	11-31 (Mild)	32-52 (Moderate)	>53 (Severe)	Total
5hr-7hr 59min	24 (15.3%)	133 (84.7%)	0 (0.0%)	0 (0.0%)	157 (100%)
8hr-10hr 59min	0 (0.0%)	102 (100%)	0 (0.0%)	0 (0.0%)	102 (100%)
11hr-13hr 59min	0 (0.0%)	79 (90.8%)	8 (9.2%)	0 (0.0%)	87 (100%)
>=14hr	0 (0.0%)	16 (69.6%)	7 (30.4%)	0 (0.0%)	23 (100%)
Total	24 (6.5%)	330 (89.4%)	15 (4.1%)	369 (100%)	369 (100%)

p value – 0.032

Participants with more than 11 hours of screen time had higher BPRS-C scores, including moderate range symptoms, which were absent in those with lower screen time. The association was statistically significant (p = 0.032).

Table 21 :- Comparison of variable, **Average screen time with last semester percentage**

Average Screen time	Last Semester Percentage			
	50%-70%	71%-90%	>=91%	Total
5hr-7hr 59min	0 (0.0%)	141 (89.8%)	16 (10.2%)	157 (100%)
8hr-10hr 59min	40 (39.2%)	62 (60.8%)	0 (0.0%)	102 (100%)
11hr-13hr 59min	87 (100%)	0 (0.0%)	0 (0.0%)	87 (100%)
>=14hr	23 (100.0%)	0 (0.0%)	0 (0.0%)	23 (100%)
Total	150 (40.7%)	203 (55.0%)	16 (4.3%)	369 (100%)

p value – 0.051

Students with high screen time (≥11 hrs) had lower academic scores, with all such students scoring between 50–70%. The association between screen time and academic performance was borderline significant (p = 0.051).

DISCUSSION

DISCUSSION

Conducted in department of Paediatrics Santosh Hospital, Ghaziabad Demographic Profile and Screen Time Usage Among Adolescents

The study included 369 adolescents, predominantly aged 15 years 11 months (71.3%), with a slight female predominance (53.1%) and the majority (87.8%) studying in the 10th class. The mean age of the study population was 15.27 ± 0.47 years, representing a relatively homogeneous age group focused on middle adolescence.

The screen time analysis (which included educational and non-educational, using all kinds of gadgets) revealed concerning patterns, with a mean daily screen time of 8.83 ± 2.78 hours. Most students (42.5%) reported 5-8 hours of daily screen time, while 27.6% spent 8-11 hours, 23.6% spent 11-14 hours, and 6.2% spent ≥14 hours on screens daily. These figures are substantially higher than the recommended limits for adolescents. The American Academy of Pediatrics and World Health Organization advise limiting screen time to less than 2 hours per day for adolescents, a threshold that was exceeded by all participants in our study.

Ahmed I et al. (2024) found that 73.8% of school-aged children in the NCR region engaged in screen use on a typical weekday, with 44.1% reporting screen use during meals. Their study focused on screen time exceeding two hours, which they considered excessive based on the guidelines from the Indian Academy of Pediatrics. The screen time reported in our study population is considerably higher, with all participants exceeding the two-hour threshold and the average approaching nine hours.

Patel M et al. (2022) categorized screen time as exceeding three hours per day for their analysis, which they associated with decreased academic performance. Again, the screen time in our cohort substantially exceeds this threshold, suggesting that our population may be at even greater risk for adverse outcomes.

The high screen time observed in our study may reflect several factors: the increasing ubiquity of digital devices, the shift toward online education (particularly following the COVID-19 pandemic), reduced opportunities for outdoor activities in urban

settings, and possibly inadequate parental monitoring of screen use. The findings raise significant concerns about the potential impact of such extensive screen exposure on adolescent development, particularly given the consistent associations between excessive screen time and various negative outcomes reported in the literature.

The gender distribution in our study was relatively balanced, with a slight female predominance. Among females, the majority (80.1%) reported screen time within the range of 5 to 7 hours 59 minutes, with no respondents exceeding 10 hours 59 minutes. This indicates a moderate usage pattern among female participants, potentially reflecting greater time management, different academic or social routines, or less involvement in screen-based leisure activities such as gaming.

In contrast, male participants demonstrated significantly higher screen time. Only 36.4% of males reported screen time within the 8 to 10 hours 59 minutes range, while over 63.6% of males exceeded this threshold—50.3% fell into the 11 to 13 hours 59 minutes category, and 13.3% reported screen time of 14 hours or more. This suggests that males are more likely to engage in prolonged screen usage, which may be attributed to higher involvement in gaming, streaming, or other digital content consumption.

Impact of Screen Time on Behavioural Outcomes

The present study utilized the Strengths and Difficulties Questionnaire (SDQ) to assess behavioural outcomes across multiple domains. The Total Difficulty Score results were particularly concerning, with 45% of adolescents scoring in the high difficulty range (20-40) and 37.9% in the slightly raised range (16-19). Only 17.1% had scores considered close to average (0-15). The mean Total Difficulty Score was 19.58 ± 3.86, indicating a substantial burden of behavioural difficulties in this adolescent population.

We found a statistically significant association between screen time and Total Difficulty Score ($p = 0.045$), with all students reporting ≥11 hours of daily screen time falling into the high difficulty category. This dose-response relationship suggests that extended screen time may contribute to or exacerbate behavioural problems in adolescents.

Comparing our findings with the literature, Wiguna T et al. (2024) reported significant variations in daily average screen time among Indonesian adolescents across different phases of the COVID-19 pandemic. While they did not specify the exact hours, they noted that reduced screen time was linked to fewer emotional, conduct, and prosocial behaviour problems. This aligns with our findings of increased behavioural difficulties with higher screen time.

Wiguna T et al. (2024) similarly employed the Strengths and Difficulties Questionnaire (adolescent version) and reported that reduced screen time was linked to fewer emotional, conduct, and prosocial behaviour problems. Their findings during the peak phase of the COVID-19 pandemic particularly emphasized this relationship, supporting our observationr of a connection between screen time and behavioural difficulties.

Paulich KN et al. (2021) found that increased screen time was moderately associated with heightened behavioural issues in their analysis of data from 11,875 participants aged 9-10 years. However, they noted that the effect sizes were modest, and socioeconomic status emerged as a stronger determinant for these measures. Their caution against interpreting screen time as directly harmful highlights the complex interplay of factors influencing behavioural outcomes. The present study did not control for socioeconomic status, which might be a limitation when interpreting the strength of the observed associations.

Parent J et al. (2016) proposed a mediating role of sleep in the relationship between screen time and behavioural health problems. They found that increased screen time was associated with greater sleep disturbances, which in turn were linked to higher levels of behavioural health problems in youth. While our study did not specifically assess sleep patterns, this mechanism could potentially explain some of the associations we observed between screen time and behavioural difficulties.

Looking at specific behavioural domains, present study study found statistically significant associations between screen time and emotional symptoms ($p = 0.002$), conduct problems ($p = 0.024$), and pro-social behaviour ($p = 0.031$). All students with screen time <8 hours had normal conduct problem scores, while higher conduct problem scores were seen predominantly in students with screen time ≥11 hours.

Similarly, normal pro-social behaviour was observed primarily in students with <11 hours of screen time, while high screen time was associated with lower pro-social scores.

The association between screen time and hyperactivity approached but did not reach statistical significance ($p = 0.054$), though students with higher screen time (≥11 hrs) exhibited more hyperactivity symptoms. All students had normal peer problem scores across all screen time categories, though the statistical significance ($p = 0.0001$) likely reflects subtle variations within the normal range rather than clinically meaningful differences.

These domain-specific findings suggest that different aspects of behaviour may be differentially affected by screen time, with emotional symptoms, conduct problems, and pro-social behaviour being particularly vulnerable. The relatively preserved peer relationships despite high screen time might reflect the social connectivity role of digital media among adolescents, a point also noted by Paulich KN et al. (2021), who found that screen time was linked to improved peer relationships in their study.

The Brief Psychiatric Rating Scale for Children (BPRS-C) results in our study showed that the majority of students (89.4%) scored in the mild range (11-31), with a mean score of 18.63 ± 7.05. Participants with more than 11 hours of screen time had higher BPRS-C scores, including moderate range symptoms (32-52), which were absent in those with lower screen time. This association was statistically significant ($p = 0.032$) and provides additional evidence for the relationship between extended screen time and psychological difficulties.

Priftis N et al. (2023) noted in their narrative review that excessive screen time was associated with an elevated risk of mental health disorders among children and adolescents. They emphasized that the impact of screen time was influenced by the type of media consumed and the manner of its usage, suggesting that future research should consider not only the quantity but also the quality and context of screen time.

Impact of Screen Time on Academic Performance

The study found that the majority of students (55.0%) scored between 71-90% in their

last semester examinations, 40.7% scored 50-70%, and only 4.3% scored ≥91%. The mean academic score was 75.95 ± 10.66%. When analyzed in relation to screen time, we observed that students with high screen time (≥11 hrs) had lower academic scores, with all such students scoring between 50-70%. The association between screen time and academic performance approached statistical significance (p =.051).

This borderline significant relationship between screen time and academic performance aligns with findings from several comparative studies. Ahmed I et al. (2024) reported that children with over two hours of screen time achieved an average grade of 76.6%, compared to an average grade of 91.5% in children with no screen exposure. The negative association they observed was more pronounced than in our study, possibly due to their inclusion of a comparison group with no screen exposure, which was absent in our cohort where all participants exceeded recommended screen time limits.

Patel M et al. (2022) similarly found that average grades decreased with increased screen time. In their study, adolescents with screen time exceeding three hours per day achieved an average grade of 62.1%, whereas those who refrained from using screen media achieved an average grade of 88.4%. This difference was statistically significant ($p < 0.001$), providing stronger evidence for the relationship than our borderline finding. Again, the inclusion of a no-screen comparison group in their study may have contributed to the more pronounced association.

Paulich KN et al. (2021) reported that increased screen time was associated with lower academic performance in their analysis of 9-10 year olds, though they noted that the effect sizes were modest and socioeconomic status was a stronger determinant. This nuanced finding suggests that the relationship between screen time and academic performance may be influenced by various confounding factors.

Adelantado-Renau M et al. (2019) provided a more detailed analysis through their systematic review and meta-analysis. They found that overall screen media usage was not significantly associated with academic performance (effect size [ES] = −0.29; 95% CI, −0.65 to 0.08). However, specific screen-based activities demonstrated adverse effects on academic outcomes. Television viewing was inversely associated with composite academic performance scores, language performance, and

mathematics performance. Similarly, video game playing was negatively linked to composite academic performance scores.

Their subgroup analyses revealed that television viewing was inversely associated with language skills specifically in children, while both television viewing and video game playing were linked to poorer composite scores in adolescents. These findings suggest that the relationship between screen time and academic performance may depend on the type of screen activity, the specific academic domain assessed, and the developmental stage of the participants.

The study did not differentiate between types of screen activities, which might explain the borderline significance of our finding. It is possible that certain screen activities (e.g., educational content) may have less negative or even positive effects on academic performance, while others (e.g., social media, gaming) may have more detrimental impacts. Future research should consider not only the quantity but also the quality and purpose of screen time when examining its relationship with academic outcomes.

Several mechanisms might explain the relationship between screen time and academic performance. Extended screen time may reduce the time available for homework, reading, and other educational activities. It may also contribute to cognitive fatigue, reduced attention span, and disrupted sleep patterns, all of which can negatively impact learning and academic performance. Additionally, the instant gratification often provided by digital media may reduce tolerance for the delayed rewards associated with academic achievement.

Relationship Between Screen Time and Emotional Symptoms

The study found a statistically significant association between screen time and emotional symptoms as measured by the SDQ Emotional Symptoms subscale ($p = 0.002$). Most participants (68.0%) had emotional symptoms scores close to average (0-5), but there was a clear pattern showing that students with screen time ≥11 hours had markedly higher emotional symptom scores. This suggests that extended screen time may be particularly detrimental to emotional well-being in adolescents.

Wiguna T et al. (2024) similarly reported that reduced screen time was linked to fewer emotional problems among Indonesian adolescents, particularly during the peak phase of the COVID-19 pandemic. Their use of the same assessment tool (SDQ) strengthens the comparability of our findings. The consistency of this relationship across different cultural contexts suggests a robust association between screen time and emotional well-being.

Priftis N et al. (2023) noted in their narrative review that excessive screen time was associated with an elevated risk of mental health disorders among children and adolescents. While they did not specifically isolate emotional symptoms, mental health disorders often include emotional components such as anxiety and depression.

Paulich KN et al. (2021) found that increased screen time was moderately associated with poorer mental health in their analysis of 9-10 year olds, though they emphasized that the effect sizes were modest. Their assessment of mental health likely encompassed emotional well-being, supporting our finding of a relationship between screen time and emotional symptoms.

Several mechanisms might explain the association between screen time and emotional symptoms. Extended screen use may reduce opportunities for in-person social interactions that are crucial for emotional development and regulation. Digital content may expose adolescents to inappropriate, disturbing, or anxiety-provoking material. Social media use, in particular, may contribute to social comparison, fear of missing out (FOMO), and body image concerns, all of which can impact emotional well-being. Additionally, the sedentary nature of screen time may reduce physical activity, which is known to have mood-enhancing effects.

The relationship may also be bidirectional, with pre-existing emotional difficulties potentially leading to increased screen time as a coping mechanism or escape. The cross-sectional study design cannot establish causality, and it is possible that adolescents with emotional symptoms may turn to screens for distraction or comfort, creating a cycle that further exacerbates their difficulties.

The stronger association at higher levels of screen time (≥11 hours) suggests a potential threshold effect, where moderate screen use may have limited impact on

emotional well-being, but excessive use becomes particularly problematic. This non-linear relationship warrants further investigation, as it may inform more nuanced recommendations for screen time limits.

Screen Time and Conduct Problems

The analysis revealed a statistically significant association between screen time and conduct problems ($p = 0.024$). All students with less than 8 hours of screen time had normal conduct problem scores (0-3), while higher conduct problem scores were seen predominantly in students with screen time ≥11 hours. This suggests that extended screen time may be associated with behavioural issues such as aggression, rule-breaking, and dishonesty.

Wiguna T et al. (2024) similarly reported that reduced screen time was linked to fewer conduct problems among Indonesian adolescents, using the same assessment tool (SDQ). Their finding during the peak phase of the COVID-19 pandemic particularly emphasized this relationship, supporting our observation of a connection between screen time and conduct issues.

The association between screen time and conduct problems may be explained by several mechanisms. Exposure to violent or inappropriate content through screens may normalize aggressive behaviour through social learning and desensitization. The interactive nature of many digital activities, particularly gaming, may reward impulsive responses and immediate gratification, potentially reinforcing patterns of behaviour that conflict with social norms and expectations. Extended screen time may also reduce opportunities for developing self-regulation skills through real-world interactions, where natural consequences for behavioural choices are experienced.

Additionally, screen time may displace important developmental activities such as family interactions, where behavioural norms are typically established and reinforced. Parent J et al. (2016) proposed that screen time may indirectly affect behavioural health problems through sleep disturbances, which can impair self-regulation and increase irritability.

The finding that conduct problems were particularly associated with very high screen time (≥11 hours) suggests a potential dose-response relationship, where the risk increases substantially beyond certain thresholds. This pattern highlights the importance of reasonable limits on screen time, as moderate use may not carry the same risks as excessive use.

It's worth noting that the direction of causality cannot be established from our cross-sectional data. It's possible that adolescents with pre-existing conduct problems may be more drawn to extended screen use, perhaps due to difficulties with other activities or relationships. Longitudinal studies would be needed to clarify the temporal relationship between screen time and conduct issues.

Screen Time and Pro-Social Behaviour

The study found a significant association between screen time and pro-social behaviour ($p = 0.031$). Normal pro-social behaviour scores (6-10) were observed only in students with less than 11 hours of daily screen time, while high screen time (≥11 hrs) was consistently associated with lower pro-social scores. This suggests that excessive screen time may compromise the development or expression of positive social behaviours such as helping, sharing, and empathy.

Wiguna T et al. (2024) similarly reported that reduced screen time was linked to fewer prosocial behaviour problems among Indonesian adolescents. Their finding that screen time was associated with prosocial behaviour difficulties, particularly during the peak phase of the COVID-19 pandemic, aligns with our observation of diminished pro-social behaviour with extended screen use.

The association between extended screen time and reduced pro-social behaviour may be explained by several mechanisms. High screen time may reduce opportunities for in-person social interactions, where pro-social skills are typically practiced and reinforced. Digital interactions often lack the nonverbal cues and immediate feedback that help develop empathy and other social skills. Additionally, some digital content may model and reinforce self-centered or aggressive behaviour rather than cooperation and altruism.

However, the relationship between screen time and social behaviour is likely complex and may depend on the specific nature of the digital activities. Paulich KN et al. (2021) found that screen time was actually linked to improved peer relationships in their study of 9-10 year olds, suggesting potential benefits for social connectivity. They proposed that social media and other digital platforms may facilitate social interaction and friendship maintenance, particularly in contexts where in-person contact is limited.

The apparent contradiction between our finding of reduced pro-social behaviour with high screen time and Paulich's finding of improved peer relationships might be reconciled by considering different aspects of social functioning. Screen time may facilitate peer connections and relationship maintenance while simultaneously reducing opportunities for developing deeper social skills like empathy and helping behaviour. Alternatively, the difference might reflect age-related factors, as our study focused on older adolescents (mean age 15.27 years) compared to Paulich's younger cohort (9-10 years).

It's also worth noting that all participants in our study had normal peer problem scores across all screen time categories, suggesting that peer relationships were relatively preserved despite high screen use. This observation partially aligns with Paulich's finding and highlights the need to distinguish between different aspects of social functioning when assessing the impact of screen time.

Screen Time and Hyperactivity

Analysis in the present study showed that students with higher screen time (≥11 hrs) exhibited more hyperactivity symptoms, although this association approached but did not reach statistical significance ($p = 0.054$). Out of 369 participants, 235 (63.7%) had hyperactivity scores within the average range (0-5), 8.7% had slightly raised scores (6), and 27.6% had high scores (7-10). The mean hyperactivity score was 4.74 ± 2.18.

The borderline significance of this association suggests a potential relationship between screen time and hyperactivity that warrants further investigation. Several mechanisms might explain such a relationship. Fast-paced digital content may condition the brain to expect constant stimulation, potentially making it difficult to

sustain attention in less stimulating environments. The frequent rewards and immediate feedback provided by many digital activities may reinforce short attention spans and impulsive behaviour. Additionally, extended screen time may displace physical activity, which is important for healthy energy regulation in adolescents.

Paulich KN et al. (2021) found that increased screen time was moderately associated with heightened behavioural issues in their analysis of 9-10 year olds, which likely included hyperactive behaviours, though they did not report specifically on hyperactivity. Their observation that the effect sizes were modest aligns with our finding of a borderline association.

The lack of a stronger association in the study might be explained by several factors. Hyperactivity symptoms may be influenced by numerous variables beyond screen time, including genetic factors, family environment, and educational settings. Additionally, some screen activities might actually require sustained attention and executive function, potentially having neutral or even positive effects on attention regulation. The relationship might also be bidirectional, with pre-existing hyperactivity potentially leading to increased screen time, as screens may be more engaging for individuals with attention difficulties.

It's worth noting that the borderline significance ($p = 0.054$) is very close to the conventional threshold for statistical significance ($p = 0.05$), suggesting that a slightly larger sample size might have detected a significant association. Future studies with larger samples and longitudinal designs would be valuable for clarifying the relationship between screen time and hyperactivity in adolescents.

Psychiatric Symptoms and Screen Time

The study utilized the Brief Psychiatric Rating Scale for Children (BPRS-C) to assess broader psychiatric symptoms. The majority of students (89.4%) scored in the mild range (11-31), 6.5% had none/very mild symptoms (0-10), and 4.1% had moderate symptoms (32-52). The mean score was 18.63 ± 7.05.

The recent study depicted a statistically significant association between screen time and BPRS-C scores ($p = 0.032$), with participants reporting more than 11 hours of screen time having higher scores, including moderate range symptoms, which were absent in those with lower screen time. This finding suggests that excessive screen

time may be associated with a broader range of psychiatric symptoms beyond those captured by the SDQ subscales.

Priftis N et al. (2023) noted in their narrative review that excessive screen time was associated with an elevated risk of mental health disorders among children and adolescents. While they did not use the BPRS-C specifically, their conclusion supports our finding of a relationship between screen time and psychiatric symptoms.

Paulich KN et al. (2021) reported that increased screen time was moderately associated with poorer mental health in their analysis of 9-10 year olds, though they emphasized that the effect sizes were modest and socioeconomic status was a stronger determinant. This aligns with our finding of a significant but potentially complex relationship between screen time and psychiatric symptoms.

The association between extended screen time and psychiatric symptoms may be explained by several mechanisms. Digital content may expose adolescents to disturbing, anxiety-provoking, or age-inappropriate material. Social media use may contribute to social comparison, cyberbullying, and body image concerns, all of which can impact mental health. Extended screen time may disrupt sleep patterns, which are crucial for mental well-being. Additionally, screen time may displace activities known to promote mental health, such as physical exercise, face-to-face social interaction, and engagement with nature.

The finding that moderate psychiatric symptoms were observed exclusively in adolescents with very high screen time (≥11 hours) suggests a potential threshold effect, where psychiatric risk increases substantially beyond certain levels of screen use. This pattern highlights the importance of reasonable limits on screen time for mental health promotion.

As with other associations in our study, the cross-sectional design limits our ability to establish causality. Adolescents with pre-existing psychiatric symptoms may be drawn to extended screen use as a coping mechanism or distraction, potentially creating a bidirectional relationship that warrants further investigation through longitudinal research.

CONCLUSION
&
RECOMMENDATIONS

CONCLUSION & RECOMMENDATIONS

Conclusion:

This study demonstrates clear associations between extended screen time and adverse outcomes across multiple domains of adolescent functioning. The findings reveal a particularly concerning pattern where screen time exceeding 11 hours daily was consistently linked with higher levels of behavioural difficulties, emotional symptoms, conduct problems, reduced pro-social behaviour, and psychiatric symptoms. The near-significant relationship between screen time and academic performance, though not meeting the conventional threshold for statistical significance, aligns with a pattern observed across multiple studies suggesting that excessive screen use may compromise scholastic achievement. The consistency of findings across different assessment measures strengthens confidence in these associations. A noteworthy aspect of these results is the apparent threshold effect, where the most pronounced negative associations emerged at very high levels of screen time. This suggests that while moderate digital engagement may have limited adverse effects, excessive use substantially increases risk for multiple negative outcomes. This pattern has important implications for developing nuanced guidelines that acknowledge the reality of digital technology in adolescents' lives while establishing reasonable boundaries.

The universal exceeding of recommended screen time limits (2 hours daily) among participants highlights a concerning gap between evidence-based guidelines and actual adolescent behaviour in contemporary digital environments. This reality necessitates not only educational efforts about appropriate screen use but also practical, implementable strategies that acknowledge the ubiquity of digital technology while promoting healthier engagement patterns.

Strengths

1. Comprehensive assessment approach: The study utilized multiple validated instruments, including the Strengths and Difficulties Questionnaire and Brief

Psychiatric Rating Scale for Children, providing a multidimensional evaluation of behavioural outcomes.

2. Adequate sample size: With 369 participants, the study had sufficient statistical power to detect meaningful associations between screen time and various outcomes.

3. Inclusion of objective academic performance: The use of actual academic grades provided an objective outcome measure beyond self-reported behavioural symptoms.

4. Focus on a critical developmental period: The concentration on middle adolescence (predominantly 15-16 years) allowed for detailed examination of screen time impacts during a particularly sensitive developmental stage.

5. Granular screen time categorization: The division of screen time into multiple categories (5-8 hours, 8-11 hours, 11-14 hours, ≥14 hours) enabled identification of potential threshold effects and dose-response relationships.

Limitations

1. Cross-sectional design: The study's cross-sectional nature precludes determination of causality or temporal relationships between screen time and observed outcomes.

2. Reliance on self-reported screen time: Screen use was self-reported rather than objectively measured, potentially introducing recall bias or social desirability bias.

3. Lack of differentiation between screen activities: The study did not distinguish between different types of screen use (educational, entertainment, social media, gaming) which may have differential effects.

4. Absence of control for confounding variables: Potential confounders such as socioeconomic status, parental education, family functioning, or pre-existing mental health conditions were not assessed or controlled for in analyses.

Recommendations

1. Implement evidence-based screen time limits in school and family policies, with particular emphasis on keeping daily screen time below 11 hours, where the most significant negative associations were observed.

2. Develop screening protocols for excessive screen use in educational and healthcare settings, targeting adolescents with very high screen time (≥11 hours) for intervention.

3. Create educational programs for adolescents, parents, and teachers about the potential behavioural and academic impacts of excessive screen time, promoting digital literacy and healthy technology habits.

4. Establish "screen hygiene" practices in educational settings, including screen-free periods, tech breaks, and structured technology use that prioritizes educational content.

5. Provide resources for parents on implementing and maintaining reasonable screen time limits, with emphasis on consistent enforcement and modeling healthy digital habits.

6. Design targeted interventions for adolescents showing behavioural difficulties and high screen time, focusing on gradual reduction strategies rather than abrupt restrictions.

7. Incorporate regular physical activity, face-to-face social interaction, and nature exposure into adolescent schedules as protective factors against negative screen time effects.

8. Implement school-based mental health screening that includes assessment of screen habits, particularly for students showing academic decline or behavioural difficulties. Conduct longitudinal studies to establish causal relationships and temporal sequences between screen time and behavioural/academic outcomes.

SUMMARY

SUMMARY

Current study was a school based cross sectional study, conducted at the Schools in NCR (National Capital Region). This study was aimed to study the impact of screen time on behaviour and academic performance in adolescent age group. Summary of the findings are follow-

- This study investigated the impact of screen time on behaviour and academic performance among 369 adolescents, predominantly aged 15 years 11 months (71.3%) with a slight female predominance (53.1%). The findings revealed concerning patterns of screen use, with participants reporting a mean daily screen time of 8.83 ± 2.78 hours—far exceeding recommended guidelines. The majority (42.5%) reported 5-8 hours of daily screen time, while 27.6% spent 8-11 hours, 23.6% spent 11-14 hours, and 6.2% spent ≥14 hours on screens daily.
- Behavioural assessment using the Strengths and Difficulties Questionnaire showed 45% of adolescents scoring in the high difficulty range (20-40) and 37.9% in the slightly raised range (16-19). Statistical analysis revealed significant associations between screen time and Total Difficulty Score ($p = 0.045$), with all students reporting ≥11 hours of daily screen time falling into the high difficulty category.
- Domain-specific analyses showed significant relationships between screen time and emotional symptoms ($p = 0.002$), conduct problems ($p = 0.024$), and pro-social behaviour ($p = 0.031$). The association with hyperactivity approached significance ($p = 0.054$). The Brief Psychiatric Rating Scale for Children (BPRS-C) also showed a significant association with screen time ($p = 0.032$), with moderate psychiatric symptoms present only in participants reporting >11 hours of screen time.
- For academic performance, students with high screen time (≥11 hrs) had lower academic scores, with all such students scoring between 50-70%. The association between screen time and academic performance approached statistical significance ($p = 0.051$).

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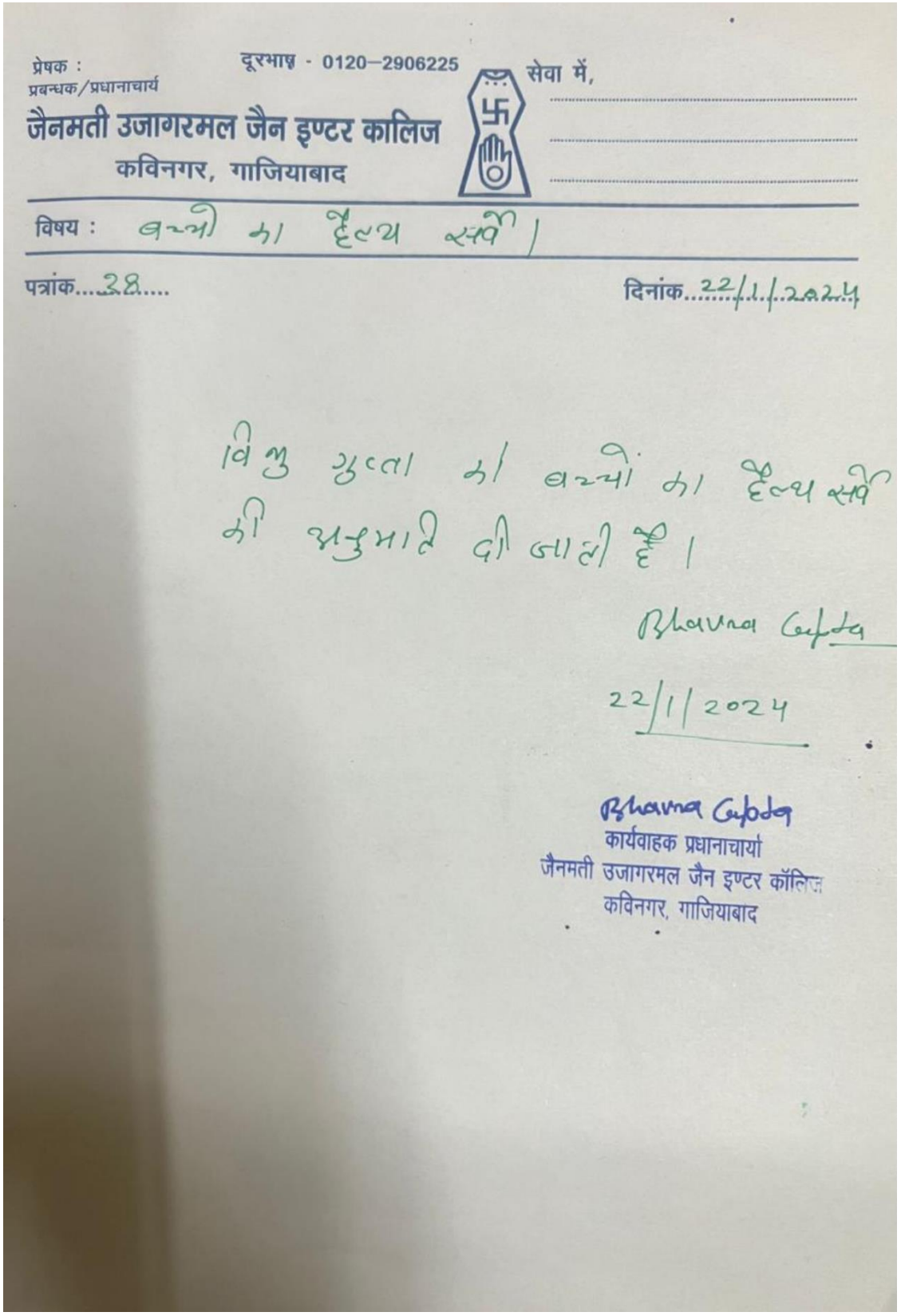
ANNEXURES

(ANNEXURE 1)

CONSENT FROM SCHOOL PRINCIPAL FOR THE STUDY



प्रेषक :
प्रबन्धक/प्रधानाचार्य
जैनमती उजागरमल जैन इण्टर कालिज
कविनगर, गाजियाबाद

दूरभाष - 0120–2906225

सेवा में,

.....

.....

.....

विषय : बच्चों का हैल्थ सर्वे।

पत्रांक...28....

दिनांक...22/1/2024

विनु गुप्ता को बच्चों का हैल्थ सर्वे की अनुमति दी जाती है।

Bhavna Gupta

22/1/2024

Bhavna Gupta
कार्यवाहक प्रधानाचार्या
जैनमती उजागरमल जैन इण्टर कॉलिज
कविनगर, गाजियाबाद

ANNEXURE II

INFORMED CONSENT FORM

Subject Identification No. for study:

Title of the Study:To study the impact of screen time on behaviour and academic performance in adolescent age group.

Name of the Principal Investigator: Dr. Vibhu Pankaj

I have received the information sheet on the above study and have read and / or understood the written information. I have been given the chance to discuss the study and ask questions. I consent for my ward to take part in the study and I am aware that this participation is voluntary. I understand that I may withdraw at any time during the study. I understand that the information collected about my ward from participation in this research and sections of any of my medical notes may be looked at by responsible persons (ethics committee members / regulatory authorities). I give access to these individuals to have access to those records.

I understand I will receive a copy of the patient information sheet and the informed consent form.

_____

_____

Signature with Name

Date

For queries contact Dr. Vibhu Pankaj (+919582068880)

INFORMED CONSENT

सूचित सहमचत

इस परीक्षण केचिए चिषय पहिान संख्या:

पररयोजना का शीषषक: To study the impact of screen time on behaviour and academic performance in adolescent age group.

भ्रूण-मातृपररणाम का एक तुिनात्मक अध्ययन,

प्रधान अन्वेषक का नाम : Dr. Vibhu Pankaj

मुझेअध्ययन पर सूिना पत्र प्राप्त हुआ हैऔर मैंनेचिखित जानकारी को पढ़चिया है/ समझचिया है। मुझेअध्ययन पर ििाषऔर सिाि पूछनेका मौका चिया गया है।

मुझेजानकारी हैचक मेरी भागीिारी स्वैखिक है, और मुझेअध्ययन मेंभाग िेनेकेचिए सहमचत है।

मुझेजानकारी हैमैंसहमचत चकसी भी समय िापस िेसकता हूँ। मुझेजानकारी हैचक

मेरी भागीिारी सेमेरेबारेमेंएकचत्रत की गई जानकारी और मेरे चिचकत्सा नोटोंकेिगों

को चजम्मेिार व्यखियोंद्वारा िेिा जा सकता है(नैचतकता सचमचत के सिस्ोंं/ चनयामक

अचधकाररयों) ।मैंअपनेररकॉर्षका उपयोग करनेकेचिए इन व्यखियोंको सहमचत िेता

हूँ।

मुझेजानकारी हैचक मुझेरोगी सूिना पत्रक की और सहमचत पत्रकी एक प्रचतिी जाएगी।

_____

_____

हस्ताक्षर ि नाम

चिनांक

For queries contact Dr. Vibhu Pankaj
(+919582068880)

Annexure III

Key To Master Chart

Scale Use - SDQ (Strength and Difficulties Questionnaire)

Area Logo
YR1
Youth Report Measures for Children and Adolescents
SDQ(S)11-17

Facility Name: _____
Code: |__|__|__|__|

Please used gummed label if available

Patient or Client Identifier: |__|__|__|__|__|__|__|__|__|__|

Surname:

Other names:

Date of Birth: __ __ / __ __ / __ __ __ __ Sex: Male ☐1 Female ☐2

Address:

Instructions: For each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain. Please give your answers on the basis of how things have been for you **over the last six months.**

	Strengths and Difficulties Questionnaire	Not True	Somewhat True	Certainly True
1.	I try to be nice to other people. I care about their feelings	O	O	O
2.	I am restless, I cannot stay still for long	O	O	O
3.	I get a lot of headaches, stomach-aches, or sickness	O	O	O
4.	I usually share with others, for example CDs, games, food	O	O	O
5.	I get very angry and often lose my temper	O	O	O
6.	I would rather be alone than with people of my age	O	O	O
7.	I usually do as I am told	O	O	O
8.	I worry a lot	O	O	O
9.	I am helpful if someone is hurt, upset or feeling ill	O	O	O
10.	I am constantly fidgeting or squirming	O	O	O
11.	I have one good friend or more	O	O	O
12.	I fight a lot. I can make other people do what I want	O	O	O
13.	I am often unhappy, depressed or tearful	O	O	O
14.	Other people my age generally like me	O	O	O
15.	I am easily distracted, I find it difficult to concentrate	O	O	O
16.	I am nervous in new situations. I easily lose confidence	O	O	O
17.	I am kind to younger children	O	O	O
18.	I am often accused of lying or cheating	O	O	O
19.	Other children or young people pick on me or bully me	O	O	O
20.	I often volunteer to help others (parents, teachers, children)	O	O	O
21.	I think before I do things	O	O	O
22.	I take things that are not mine from home, school or elsewhere	O	O	O
23.	I get along better with adults than with people my own age	O	O	O
24.	I have many fears, I am easily scared	O	O	O
25.	I finish the work I'm doing. My attention is good	O	O	O

Please turn over – there are a few more questions on the other side

Do you have any other comments or concerns?

SOURCE: Mental Health National Outcomes and Casemix Collection: Overview of Clinician-Rated and Consumer Self-Report Measures V1.50, Mental Health & Suicide Prevention Branch, Department of Health and Ageing

SDQ items and Scale Summary scores

The first 25 items in the SDQ comprise 5 scales of 5 items each. It is usually easiest to score all 5 scales before working out the Total Difficulties score. For data entry, the responses to items should always be entered the same way (see below), but they are not all scored the same way. Somewhat True is always scored as 1, but the scoring of Not True and Certainly True varies with each item (see Table 1). For each of the 5 scales the score can range from 0-10 if all 5 items were completed. Scale scores can be prorated if at least 3 items were completed.

Table 1: The individual SDQ items and the Total score derived from them.

		Not True	Some-what True	Certainly True	
Standard Values for Data Entry ========➔		**0**	**1**	**2**	
Data element	**SDQ Item number and description**		**Item Score**		**Summary Score**
Emotional Symptoms Scale					0-10
Item 03	Often complains of headaches, ...	0	1	2	
Item 08	Many worries or often seems worried	0	1	2	
Item 13	Often unhappy, depressed or tearful	0	1	2	
Item 16	Nervous or clingy in new situations	0	1	2	
Item 24	Many fears, easily scared	0	1	2	
Conduct Problem Scale					0-10
Item 05	Often loses temper	0	1	2	
Item 07	**Generally well behaved .....**	**2**	**1**	**0**	
Item 12	Often fights with other children	0	1	2	
Item 18	Often lies or cheats	0	1	2	
Item 22	Steals from home, school.....	0	1	2	
Hyperactivity Scale					0-10
Item 02	Restless, overactive....	0	1	2	
Item 10	Constantly fidgeting ...	0	1	2	
Item 15	Easily distracted	0	1	2	
Item 21	**Thinks things out before acting**	**2**	**1**	**0**	
Item 25	**Good attention span, ...**	**2**	**1**	**0**	
Peer Problem Scale					0-10
Item 06	Rather solitary, prefers to play alone	0	1	2	
Item 11	**Has at least one good friend**	**2**	**1**	**0**	
Item 14	**Generally liked by other children**	**2**	**1**	**0**	
Item 19	Picked on or bullied....	0	1	2	
Item 23	Gets along better with adults ...	0	1	2	
Prosocial Scale					0-10
Item 01	Considerate of other people's feelings	0	1	2	
Item 04	Shares readily with other children, ...	0	1	2	
Item 09	Helpful if someone is hurt....	0	1	2	
Item 17	Kind to younger children	0	1	2	
Item 20	Often volunteers to help others ...	0	1	2	
SDQ Total Difficulties Score = Sum of Scales below					0-40
	Emotional Symptoms Scale		0-10		
	Conduct Problem Scale		0-10		
	Hyperactivity Scale		0-10		
	Peer Problem Scale		0-10		

NB. Bold items indicate reverse scoring

SOURCE: Mental Health National Outcomes and Casemix Collection: Overview of Clinician-Rated and Consumer Self-Report Measures V1.50, Mental Health & Suicide Prevention Branch, Department of Health and Ageing

Interpretation of SDQ scale

SELF COMPLETED VERSIONS	'This score is close to average - clinically significant problems in this area are unlikely'	'This score is slightly raised, which may reflect clinically significant problems'	'This score is high - there is a substantial risk of clinically significant problems in this area'
Total Difficulties Score	0-15	16-19	20-40
Emotional Symptoms Score	0-5	6	7-10
Conduct Problem Score	0-3	4	5-10
Hyperactivity Score	0-5	6	7-10
Peer Problem Score	0-3	4-5	6-10
	'This score is close to average - clinically significant problems in this area are unlikely'	'This score is slightly low, which may reflect clinically significant problems'	'This score is low - there is a substantial risk of clinically significant problems in this area'
Prosocial Behaviour Score	6-10	5	0-4

Name: _____ DOB: _____ Case#: _____ Date: _____

BRIEF PSYCHIATRIC RATING SCALE FOR CHILDREN (BPRS-C)

SEVERITY: 0-NOT PRESENT 1-VERY MILD 2-MILD 3-MODERATE
4-MODERATE- SEVERE 5-SEVERE 6-EXTREMELY SEVERE

☐ **1. UNCOOPERATIVENESS;**
NEGATIVE; UNCOOPERATIVE, RESISTANT DIFFICULT TO MANAGE, LOSES TEMPER, ANNOYS OTHERS, IRRITATBLE, ANGRY; NO SOCIALIZATION WITH CHILDREN HIS OWN AGE.

☐ **2. HOSTILITY;**
ANGRY OR SUSPICIOUS AFFECT, BELLIGERANCE, BLAMES OTHERS, OBSCENE LANGUAGE, VERBAL CONDEMNATION OF OTHERS: FIGHTS WITH OTHER CHILDREN, DOES NOT LISTEN, TEASES OTHERS, REFUSES TO SHARE, AND TAKES THINGS THAT DO NO BELONG TO HIM.

☐ **3. MANIPULATIVENESS;**
LYING, CHEATING, EXPLOITIVE OF OTHERS, PROVOKES FIGHTS, DESTROYS PROPERTY, CRUEL, PHYSICAL FIGHTS

☐ **4. DEPRESSED MOOD;**
FEEL SAD, TEARFUL, DEPRESSIVE DEMEANOR, IRRITABLE MOOD, NOT HUNGRY, SLEEP PROBLEMS, LOW ENERGY, LOW CONCENTRATON, NO HOPE, IS DOWN ON SELF, WORRIES A LOT, LESS FUN

☐ **5. FEELING OF INFERIORITY;**
LACKING SELF-CONFIDENCE, SELF-DEPRECIATORY, FEELING OF PERSONAL INADEQUACY:

☐ **6. SUICIDAL IDEATION;**
THOUGHTS, THREATS OR ATTEMPTS OF SUICIDE

☐ **7. PECULIAR FANTASIES;**
RECURRENT, ODD, UNUSUAL, OR AUTISTIC IDEATIONS

☐ **8. DELUSIONS;**
IDEAS OF REFERENCE, PERSECUTORY OR GRANDIOSE DELUSIONS

☐ **9. HALLUCINATIONS;**
VISUAL, AUDITORY/ OTHER HALLUCINATORY EXPERIENCES OR PERCEPTIONS

☐ **10. HYPERACTIVITY;**
EXCESSIVE ENERGY EXPENDITURE; FREQUENT CHANGES IN POSTURE, PERPETUAL MOTION; ACTS AS IF DRIVEN BY A MOTOR, JUMPING ON FURNITURE

☐ **11. DISTRACTIBILITY**
POOR CONCENTRATION; SHORTENED ATTENTION SPAN, REACTIVITY TO PERIPHERAL STIMULI: ATTENTIONAL DEFICIT;

Name: _____ DOB: _____ Case#: _____ Date: _____

BRIEF PSYCHIATRIC RATING SCALE FOR CHILDREN (BPRS-C)

☐ 12. SPEECH OR VOICE PRESSURE;
LOUD, EXCESSIVE, PRESSURED SPEECH

☐ 13. UNDERPRODUCTIVE SPEECH;
MINIMAL, SPARSE, INHIBITED VERBAL RESPONSE; NO SPEECH BY AGE 2, NO PHRASES BY AGE 3.

☐ 14. EMOTIONAL WITHDRAWAL;
SPONTANEOUS RELATIONS TO EXAMINER, LACK OF PEER INTERACTION, HYPOACTIVITY:

☐ 15. BLUNTED AFFECT;
DEFICIENT EMOTIONAL EXPRESSION, BLANKNESS, FLATNESS OF AFFECT; LACK OF EYE CONTACT

☐ 16. TENSION;
NERVOUSNESS/ FIDGETINESS; NERVOUS MOVEMENTS OF HANDS OR FEET, INABILITY TO RELAX, PHYSICAL PROBLEMS; (HEADACHES/STOMACHES)

☐ 17. ANXIETY:
CLINGING BEHAVIOR, SEPARATION ANXIETY, PREOCCUPATION WITH ANXIETY TOPICS, FEARS OR PHOBIAS; SLEEP PROBLEMS, AVOIDING BEING LEFT ALONE

☐ 18. SLEEP DIFFICULTIES;
INABILITY TO FALL ASLEEP, INTERMITTENT AWAKENING, SHORTENED SLEEP TIME

☐ 19. DISORIENTATION:
CONFUSION OVER PERSONS, PLACES OR THINGS

☐ 20. SPEECH DEVIANCE;
INFERIOR LEVEL OF SPEECH DEVELOPMENT; UNDERDEVELOPED VOCAVULARY; MISPRONUNCIATIONS; FEW WORDS OR NONE.

☐ 21. STEREOTYPY
RHYTHMIC; REPETITIVE, MANNERISTIC MOVEMENT OR POSTURE; FLICKING FINGERS; FOLLOWING THINGS THAT MOVE

TOTAL SCORE: _____
(ADD UP EACH ITEM; RECORD ON FRONT PAGE AS WELL)

SCALE INTERPRETATION:

1. NONE /VERY MILD (0-10)
2. MILD (11-31)
3. MODERATE (32-52)
4. SEVERE (>53)

Annexure IV

PATIENT INFORMATION SHEET

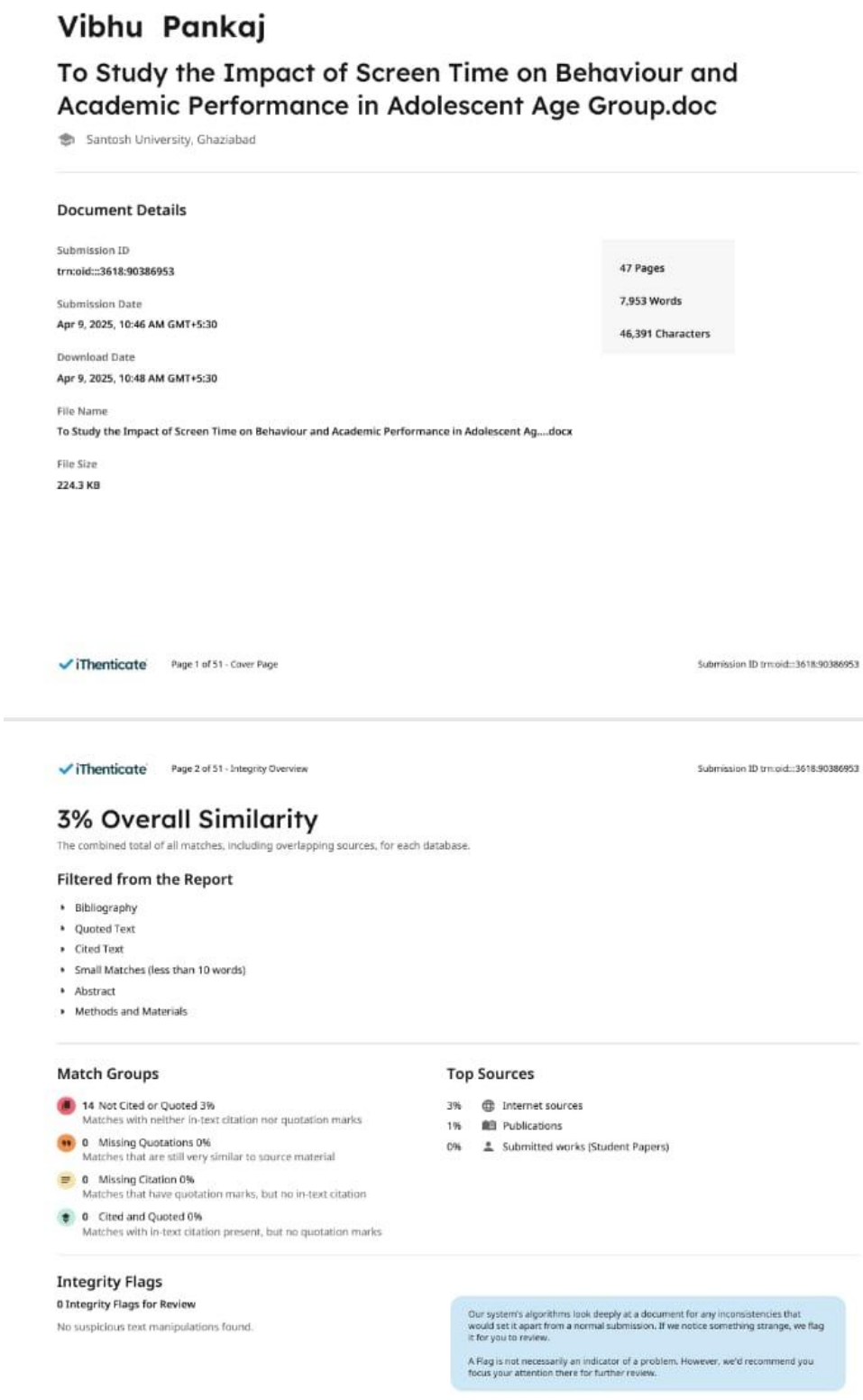
Patient's name:

Study Subject No.:

Background to the study: I, Dr. Vibhu Pankaj, MD Pediatrics post graduate, am conducting a study "**To study the impact of screen time on behaviour and academic performance in adolescent age group**". This study will help in determining the impact of screen time on students behaviour and their scholastic performance.

Enrolment in the study: Participation in the study is on a voluntary basis. The subject will not be given any treatments as this is a cross sectional study. Your ward may volunteer to participate in this study after you (the parent) have signed the written informed consent form. Once enrolled, your details will be filled in the proforma. These details will be used while compiling the result. You may leave the study at any point of time if you so desire. If you choose to opt out of the study during any point of time, your details will not be used. This is an absolutely safe study. There is no risk involved per se.

ANTI PLAGIARISM CERTIFICATE



Vibhu Pankaj

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ETHICAL COMMITTEE CLEARANCE

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F. No. SU/R/2023/2489[36] Dated: 26.09.2023

Subject: Grant of Ethical Clearance for **Thesis Protocol** Topic **"To study the impact of screen time on behaviour and academic performance in adolescent age group"**, submitted by **Dr. VIBHU PANKAJ,** MD/MS student of Batch 2022-2023, Department of **PAEDIATRICS**.

*****

With reference to his/her request for grant of Ethical Clearance for the Thesis Protocol entitled **"To study the impact of screen time on behaviour and academic performance in adolescent age group", Dr. VIBHU PANKAJ** is informed that the **Thesis Protocol** submitted by him/her was considered by the **Screening Committee** of the Santosh Medical College & Hospital in its meetings held on 17.07.2023 to 28.07.2023. The recommendations of the **Screening Committee** were considered in detail by the **Institutional Ethics Committee** in its meeting held on **23.09.2023** and the same was **approved** by the **Ethics Committee**.

He /She is informed accordingly for further necessary action.

[Dr. NARESH SHARMA]
REGISTRAR

SANTOSH "DEEMED TO BE UNIVERSITY" REGISTRAR GHAZIABAD, NCR DELHI

Dr. VIBHU PANKAJ
MD/MS student of batch 2022-2023
Department of PAEDIATRICS
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Copy to:

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4. The Dean – Research
5. The Director - IQAC
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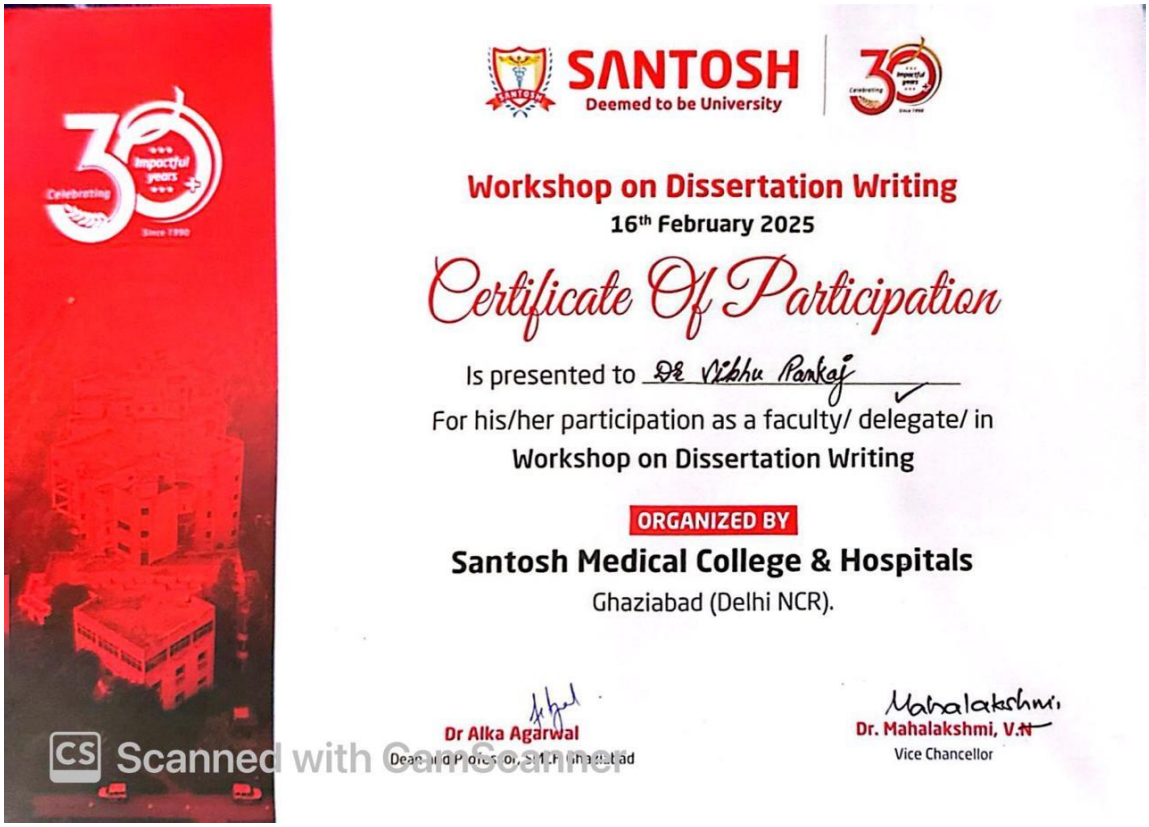
7. HOD of PAEDIATRICS



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Workshop on Dissertation Writing

16th February 2025

Certificate Of Participation

Is presented to Dr Vibhu Pankaj

For his/her participation as a faculty/ delegate/ in

Workshop on Dissertation Writing

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Ghaziabad (Delhi NCR).

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MASTER CHART

S.N.	Age	Gender	Class	Average Screen Time (hrs)	Total Difficulty Score	Emotional Symptoms Score	Conduct Pattern Score	Hyperactivity Score	Peer Problem Score	Prosocial Behaviour	BPRS-C SCORE	Last Semester %
1	15	Female	10	8	15	3	4	1	2	8	12	68
2	15	Female	10	6	19	4	3	4	1	7	14	90
3	15	Female	10	7	20	6	2	3	1	8	7	91
4	15	Female	10	7	21	4	2	8	1	6	12	84
5	15	Male	10	14	21	5	2	4	1	9	30	64
6	14	Male	10	9	17	4	3	2	3	7	15	72
7	15	Female	10	5	14	3	2	2	1	9	11	88
8	15	Male	10	10	22	6	4	5	2	6	22	66
9	15	Female	10	6	16	4	2	3	2	8	13	85
10	14	Male	10	12	23	5	3	6	3	7	24	70
11	16	Female	10	7	18	5	2	4	1	8	14	82
12	16	Male	10	11	24	7	4	7	2	6	26	65
13	15	Female	10	6	15	3	2	3	1	9	10	89
14	14	Male	10	13	25	6	5	7	3	5	28	62
15	15	Female	10	8	17	4	3	4	2	8	16	76
16	16	Male	10	9	19	5	3	5	1	7	18	71
17	15	Female	10	7	16	3	2	3	2	9	13	86
18	15	Male	10	12	26	7	4	8	3	5	30	63
19	14	Female	10	6	15	4	2	2	1	8	12	87
20	15	Male	10	10	22	6	3	6	2	6	23	68
21	16	Female	10	5	14	3	2	2	1	9	10	92
22	16	Male	10	14	27	7	5	9	3	4	31	60
23	15	Female	10	7	17	4	3	3	2	8	14	83

24	15	Male	10	11	23	6	4	7	2	5	25	67
25	16	Female	10	8	18	5	2	4	1	7	16	81
26	15	Male	10	13	25	7	5	8	3	4	29	61
27	15	Female	10	6	16	3	2	3	2	9	13	88
28	16	Male	10	10	21	5	3	6	2	6	22	69
29	15	Female	10	7	17	4	2	4	1	8	15	84
30	15	Male	10	12	24	6	4	7	3	5	27	64
31	16	Female	10	5	15	3	2	2	1	9	11	90
32	15	Male	10	13	26	7	5	8	3	4	32	59
33	15	Female	10	8	18	4	3	4	2	7	17	79
34	16	Male	10	9	20	5	3	5	2	6	19	73
35	15	Female	10	6	16	3	2	3	1	8	13	86
36	15	Male	10	11	23	6	4	7	3	5	24	66
37	16	Female	10	7	17	4	2	4	1	9	14	85
38	15	Male	10	13	25	7	5	8	3	4	28	62
39	15	Female	10	5	15	3	2	2	1	8	12	89
40	16	Male	10	10	22	5	3	6	2	6	21	70
41	15	Female	10	8	18	4	3	4	2	7	16	80
42	15	Male	10	12	24	6	4	7	3	5	26	65
43	16	Female	10	6	16	3	2	3	1	9	13	87
44	15	Male	10	14	27	7	5	9	3	4	33	58
45	15	Female	10	7	17	4	2	4	1	8	15	83
46	16	Male	10	9	19	5	3	5	2	6	18	74
47	15	Female	10	6	15	3	2	2	1	9	12	88
48	15	Female	10	8	15	3	4	1	2	8	12	68
49	15	Female	10	6	19	4	3	4	1	7	14	90
50	15	Female	10	7	20	6	2	3	1	8	7	91

51	15	Female	10	7	21	4	2	8	1	6	12	84
52	15	Male	10	14	21	5	2	4	1	9	30	64
53	15	Male	10	9	17	4	3	2	3	7	15	72
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56	15	Female	10	6	16	4	2	3	2	8	13	85
57	15	Male	10	12	23	5	3	6	3	7	24	70
58	16	Female	10	7	18	5	2	4	1	8	14	82
59	16	Male	10	11	24	7	4	7	2	6	26	65
60	15	Female	9	6	15	3	2	3	1	9	10	89
61	15	Male	10	13	25	6	5	7	3	5	28	62
62	15	Female	10	8	17	4	3	4	2	8	16	76
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67	15	Male	9	10	22	6	3	6	2	6	23	68
68	15	Female	9	5	14	3	2	2	1	9	10	92
69	16	Male	9	14	27	7	5	9	3	4	31	60
70	15	Female	9	7	17	4	3	3	2	8	14	83
71	15	Male	9	11	23	6	4	7	2	5	25	67
72	16	Female	10	8	18	5	2	4	1	7	16	81
73	15	Male	10	13	25	7	5	8	3	4	29	61
74	15	Female	10	6	16	3	2	3	2	9	13	88
75	16	Male	10	10	21	5	3	6	2	6	22	69
76	15	Female	10	7	17	4	2	4	1	8	15	84
77	15	Male	10	12	24	6	4	7	3	5	27	64

78	16	Female	10	5	15	3	2	2	1	9	11	90
79	15	Male	10	13	26	7	5	8	3	4	32	59
80	15	Female	10	8	18	4	3	4	2	7	17	79
81	16	Male	10	9	20	5	3	5	2	6	19	73
82	15	Female	10	6	16	3	2	3	1	8	13	86
83	15	Male	10	11	23	6	4	7	3	5	24	66
84	16	Female	9	7	17	4	2	4	1	9	14	85
85	15	Male	10	13	25	7	5	8	3	4	28	62
86	15	Female	10	5	15	3	2	2	1	8	12	89
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89	15	Male	10	12	24	6	4	7	3	5	26	65
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91	15	Male	10	14	27	7	5	9	3	4	33	58
92	15	Female	10	7	17	4	2	4	1	8	15	83
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94	15	Female	10	6	15	3	2	2	1	9	12	88
95	15	Female	9	8	15	3	4	1	2	8	12	68
96	15	Female	10	6	19	4	3	4	1	7	14	90
97	15	Female	10	7	20	6	2	3	1	8	7	91
98	15	Female	10	7	21	4	2	8	1	6	12	84
99	15	Male	10	14	21	5	2	4	1	9	30	64
100	15	Male	10	9	17	4	3	2	3	7	15	72
101	15	Female	10	5	14	3	2	2	1	9	11	88
102	15	Male	10	10	22	6	4	5	2	6	22	66
103	15	Female	10	6	16	4	2	3	2	8	13	85
104	15	Male	10	12	23	5	3	6	3	7	24	70

105	16	Female	10	7	18	5	2	4	1	8	14	82
106	16	Male	10	11	24	7	4	7	2	6	26	65
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126	15	Male	10	13	26	7	5	8	3	4	32	59
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132	15	Male	10	13	25	7	5	8	3	4	28	62
133	15	Female	10	5	15	3	2	2	1	8	12	89
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167	15	Male	10	13	25	7	5	8	3	4	29	61
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